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November 16, 1944

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The IRON AGE

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Nov. 16, 1944

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Back Home Again

RETURNING home after seven weeks abroad in a war ravaged country makes one doubly appreciative of being an American. It would be a wonderful thing if we could send our citizens abroad in ten or twenty thousand lots so that they might better appreciate the privileges and benefits of working and living in our country.

Take, for example, such an elemental thing as eating. The British Isles, thanks largely to lend-lease, have had enough to eat but the variety of foods is so limited that mealtime is a more or less monotonous repetition of preceding menus. Some restaurants in London disguise this as best they can by printing the bills of fare in French, but jugged hare and braised pigeon taste the same in any language. As for powdered eggs, which are the only kind available, and pork sausage with a content of ten per cent pig and ninety per cent corn meal, the less said the better.

Next to the human desire for variety in food comes another simple need, that of shelter. It is not particularly appealing to have to sleep in shifts at the home of a relative or friend because your own house has been destroyed, or in a cot in a subway station as many are still doing because they have no friends or relatives with available beds. Nor, as still more are doing, in partially destroyed homes with tarpaulins covering gaping roofs and with the wind blowing in through glassless windows. Imagine how we of New York or you of Philadelphia or Chicago or any metropolis would feel if in any one of these cities nearly a million homes had been rendered uninhabitable by bomb damage.

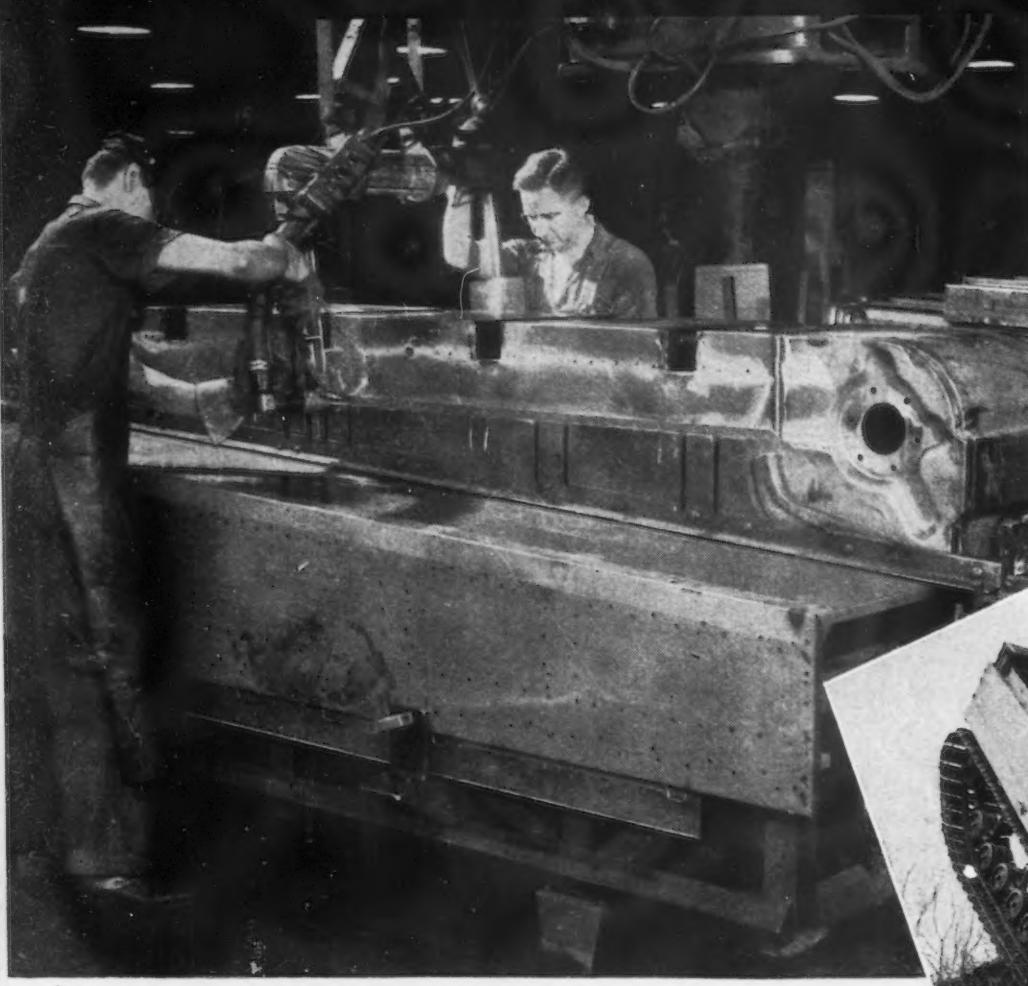
Worst of all, from the psychological standpoint, has been the blackout. We have never had a real blackout in this country; a complete absence of all light, even the faintest glimmer. In Great Britain curtains must be drawn at sunset and kept drawn until sunrise; skylights in factories have had the glass replaced with wood or metal and roof ventilators have had to be completely closed to avoid the slightest glow. As a result, ventilation at night in both homes and factories is just something that isn't and nightshifts in metal working and steel plants particularly have experienced almost intolerable working conditions.

Trials and tribulations of this sort develop heroes of the home front, just as battles do on the war front. The story was told me of a watcher, stationed on an elevation adjoining a war plant, whose duty it was to watch for buzz bombs and sound the alarm when one was headed in that direction and seemed likely to hit the plant. In the days when so many of these were coming over, workers did not take shelter at the ordinary alert alarm but waited for the local observer to advise them if damage were imminent. They could not afford to interrupt production unless absolutely necessary.

One night, after the siren blew, the observer reported a bomb headed directly toward his station and the plant. "It's coming this way, boys," he said. "I'll tell you in a minute if it's necessary for you to take shelter." Then: "Keep on working, fellows, you're safe, it's falling right here at my station. Goodbye and God bless you."

I cite these things because Thanksgiving is coming and we indeed have something to be thankful for in that we live in America.

John Deventer



Welding the hull for a "Weasel." Three submersion tests are made to assure water tightness.



Deep mud or steep hills cannot stop the fighting "Weasel."

THESE "WEASELS" FIGHT

Mud, sand, snow, water — they all are the same to the Studebaker Corporation's "Weasel," officially known to the combat forces as the M29 cargo and personnel carrier. Powered by a standard six-cylinder Studebaker Champion engine, this track-laying vehicle is designed to strike swiftly and stealthily over a greater variety of terrain than any other military conveyance.

Inland's part in the production of "Weasels" was to furnish 18-gage Hot Rolled Pickled Sheets for the all-welded, water-tight hull; 7 and 9-gage steel for hull reinforcements; 10-gage sheets for cold pressed guide wheels; 13-gage steel for the cold formed bogie wheels and silicon manganese spring steel bars for the four springs on each "Weasel."

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record of "on-time" deliveries and uniform high quality—performance that has speeded many "Weasels" to fighting fronts throughout the world.

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**INLAND
STEEL**

November 14, 1944

- Lowest cost producer of the nine DPC aluminum reduction plants throughout the nation is the Alcoa operated plant at Meade, showing a cost of 11.87c. a lb. for operation, excluding overhead, which might add another quarter cent a lb.
- Most recent War Department figures show that 29,354 fixed price contracts have been cancelled and of this amount 25,560 have already been settled. These contracts would have cost approximately \$12,000,000,000 to complete. In dollar value \$7,794,- 280,000 worth has been settled by payment to contractors of \$330,100,000.
- The stimulus of the success of the electrolytic tinning line has resulted in the electrodeposition of zinc on continuous strip up to 38 in. in width at a speed of 160 ft. per min. Coating weights range from 0.1 to 0.2 oz. of zinc for each square foot of strip.
- Republic's Warren plant, employing the Brassert-Cape direct reduction process, has been in operation about a month. Considerable difficulties have been encountered, and the product now is up to about 30 per cent metallic Fe, whereas reduction in the 90's is the target.

But: The many operational problems are being ironed out and better results are in prospect.

- Superfortresses in their latest raid on the Japanese homeland report seeing a new Jap twin-motored fighter which is very fast. Enemy propaganda has recently claimed quantity production of a twin-motored all-wooden airplane, similar but superior to the famed British Mosquito.

- Centrifugal casting boomed as a panacea for foundry production problems, was set back by the recent abandonment by a large mid-western foundry of its equipment for centrifugally casting cylinder sleeves.

Surprisingly enough, porosity was troublesome and machining costs proved higher than for static castings.

- Sweden has absorbed refugee aliens to the amount of almost 3½ per cent of its total population, mostly Norwegians, Danes, and Finns.

- Sometimes the British press gets as involved in its inconsistencies as the American. Despite traditional liking for the Italians, the London press has waged a violent vendetta against use of Italian prisoners-of-war for repairing damaged houses in London because the prisoners were lodged in housing suitable for bombed-out civilians.

Consequently the prisoners have been removed and the houses are not repaired. The same press meanwhile demands that British rebuilding be carried out by German prisoners after the war.

- Cancellations in lend-lease steel to Great Britain has caused four steel companies to reduce open-hearth operations.

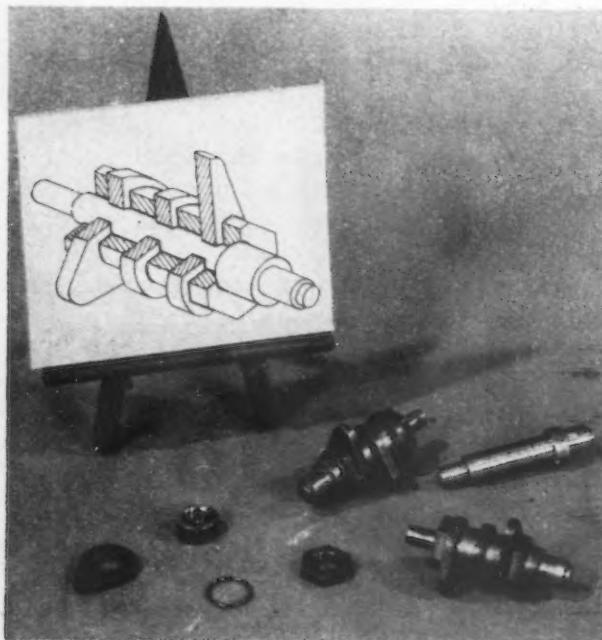
Another factor in reducing the steel operating rate has been the falling off in the demand for open hearth and electric furnace alloy steel. However, the demand for ammunition steel may make up for this loss.

- Lack of trained crews and insufficient fuel are preventing the Germans from putting their full strength into the air, General Arnold revealed recently. The Luftwaffe, however, has more planes now than ever before.

The limited range of jet planes gives Germany an advantage in that it is able to send them up to defend strategic points. The United States is as yet unable to send jets out as protection for bombers because of the longer distances involved. In certain respects, German jet propulsion planes are superior to many of the orthodox planes of the United States.

- Bronzes of greatly increased strength and toughness have been developed in Britain. A flux (containing borax, sand, and copper oxide) de-gassing process enables tin bronzes and phosphor bronze to be produced from ordinary commercial grades of metal, or from scrap.

... Electric Furnace Brazing Being



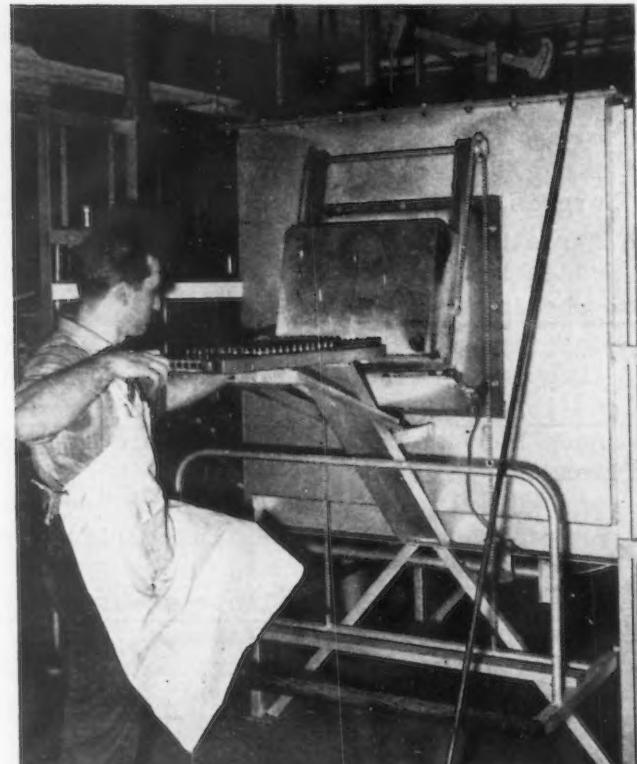
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LEFT

FIG. 1—Steel cam shaft for aerial camera before (center) and after (right foreground) copper brazing in controlled atmosphere electric furnace. Typical component parts are also shown, including preplaced copper wire rings. Heavy lines in sketch indicate penetration of brazing metal throughout all joints by capillary attraction.

• • •

vary from tiny parts for aerial cameras, measured in fractions of an inch and weighing less than an ounce, to large cooling fans for motors and generators 4½ ft. in diameter and weighing 400 lb. Equipments utilized range from small box-type furnaces that can be put in the corner of a shop or laboratory or directly in the production line, up to large roller-hearth conveyor-type furnaces 160 ft. long. Thus it has been found that the furnace brazing process has great adaptability to wide ranges of sizes and weights of assemblies as well as rates of production.



• • •

RIGHT

FIG. 2—Tray load of aerial camera parts about to be charged into box-type copper brazing furnace.

• • •

PRIOR to 1929, the electric furnace brazing process was relatively unknown. Its use was largely limited to the manufacture of only a few products, such as tungsten contacts, golf shafts and various parts for steam turbines and electric refrigerators. The use of the process steadily increased during the succeeding years, however, and when the present war started, furnace brazing was rather generally employed in the manufacture of parts for automobiles, refrigerators and business machines.

Thus, familiarity with the advantages of furnace brazing by manufacturers of such parts resulted in the fabrication of many subassemblies which might otherwise have to be forged, cast or machined from solid stock. Furnace brazing of subassemblies made of stampings, screw machine parts and tubing has materially speeded up production, reduced costs and released much needed forging and machining capacity for other important work. Furthermore, these parts come from the furnaces with clean, bright surfaces and strong, tight bonds, thus presenting a good appearance and assuring a long life.

Furnace capacity has rapidly increased to meet current demands. The number of brazing furnaces installed during 1941-43 was equivalent to

those installed during the whole 1929-40 period. In addition, a new type combination brazing and heat-treating furnace has been developed. With existing brazing furnace capacity now estimated to be over 150,000 lb. net per hr., a large number of unique and interesting assemblies are now in production and unquestionably there will be still other new applications of this process as time goes on.

Typical furnace brazed assemblies

A typical example of the use of furnace brazing for fabricating small assemblies is in the manufacture of parts for aerial cameras. When a reconnaissance plane travels hundreds of miles to get some pictures, everything possible must be done to assure dependability of the working parts of the camera such as in the shutter mechanism. For this reason, the Fairchild Camera & Instrument Corp., Ja-

Widely Extended . . .

By H. M. WEBBER

Industrial Heating Division,
General Electric Co., Schenectady

maica, N. Y., has found it advantageous to use furnace brazed assemblies in place of riveted or pinned ones wherever possible. Riveted or pinned assemblies are subject to working loose in service due to the severe impacts and vibrations they receive. Furnace brazed ones, however, being much stronger, are highly dependable and it is said, never work loose. Also, due to their great strength, they can be made considerably smaller. Elimination of the extra size formerly required for the pins gives further reduction in volume. These advantages have made it possible to build the cameras more compactly, decreasing both their size and weight.

Manufacturing savings are also realized because the cost of the furnace brazed assemblies is considerably

. . . Production of war goods has provided a fertile field for the extension of electric furnace brazing. In the first of a two part article, Mr. Webber, who has written many articles on this subject before, illustrates how stampings brazed to each other or to screw machine parts have replaced other methods of fabrication in the manufacture of ordnance and aircraft components.

main shaft, the cams with their integral collars would have to be hogged out of solid stock. For furnace-brazing, however, the cams are simply blanked out on a punch press and the two collars and two nuts are made on an automatic screw machine, all at about one-tenth of the cost of machining integral cams and collars for pinning.

The camshaft illustrated is approximately 1 in. long and weighs about $\frac{1}{2}$ oz. It is fabricated from eight parts,

consisting of SAE 1020 steel cams and spacers pressed on a shaft. Copper wire rings, placed at the joints during assembly, provide the brazing metal and melt in the furnace heat of approximately 2050 deg. F. The copper is drawn into and throughout all joints by capillary attraction as indicated by the heavy lines in the sketch, making uniform bonds having great strength. After brazing, the assemblies are case hardened.

Fig. 2 shows a trayload of typical camera parts prepared for brazing and ready to be charged into a box type, copper brazing furnace. This furnace has a heating chamber with nickel-chromium, ribbon-type electric heating units for 2100 deg. F. maximum operating temperature, and a waterjacketed cooling chamber. Protective atmosphere is maintained in both chambers. Inasmuch as the work is both heated and cooled in this atmosphere, the parts come out clean and bright, with smooth, neat copper fillets at the joints.

Fig. 3 is a photomicrograph of a

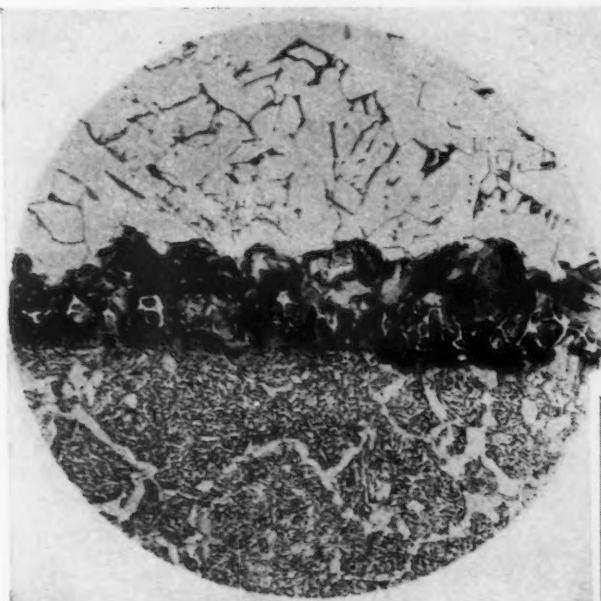
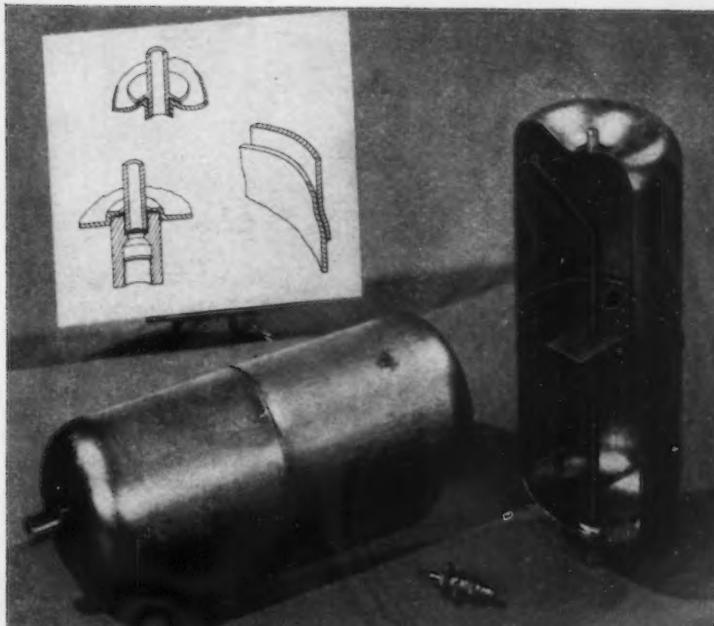
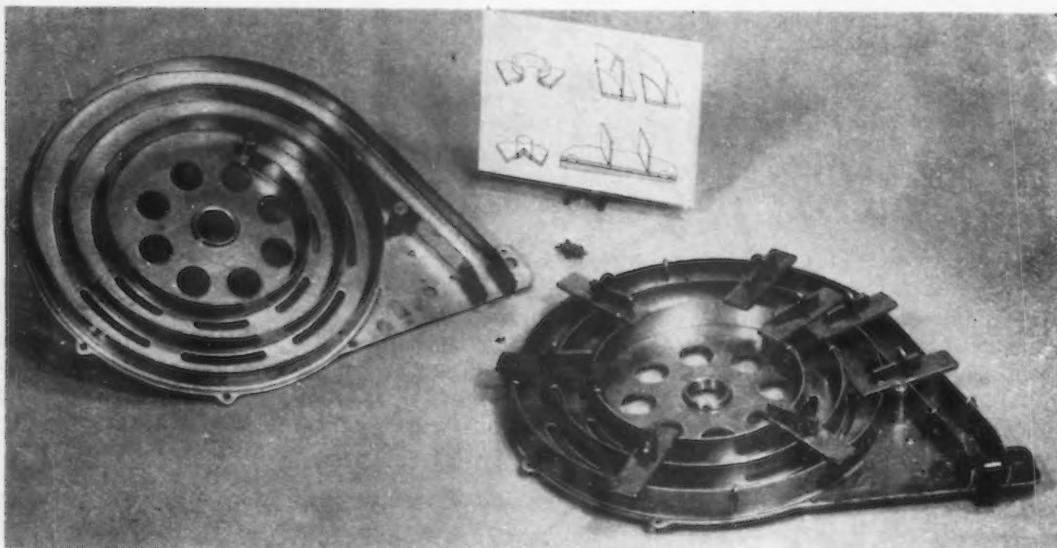


FIG. 3—Typical photomicrograph of copper-brazed bond between two SAE 1010 steel members.

less than that of the riveted or pinned ones. Pinned assemblies must be set up in jigs and carefully drilled and reamed for tiny tapered pins, such assembling costing in the order of three times as much as for the assembling of parts for furnace brazing. The biggest cost savings, however, are in the making of individual parts. For example, if the cams of the cam-shaft Fig. 1 were taper-pinned to the





○ ○ ○

LEFT

FIG. 5—Copper brazed end plate of magazine for 20 mm. Oerlikon machine gun. When copper "hairpins" (lower right) melt, the liquid brazing metal is drawn along the seams considerable distances by capillary attraction.

○ ○ ○

typical copper brazed joint between two pieces of steel. The bond is across the center of the field. In this instance, the line of copper is no longer straight, as would be expected between two flat surfaces, but it is now broken up by grains of the steel which have actually knitted across the joint; also the copper has alloyed with the steel, darkening the grains at the interfaces. The copper has also taken iron into solution, some of which has probably been thrown out upon cooling and seems to be indicated by the circular iron-rich particles shown in the bond. All of these knitting and alloying actions contribute to high strength and generally give bonds which are a great deal stronger than copper.

Tight Joints in Freon Bombs

A furnace-brazed item which has been made in very large quantities for the U. S. Army is the insecticide bomb (Fig. 4). In this illustration and subsequent ones there is shown the 1-in. long cam shaft previously illustrated in Fig. 1, to convey the relative sizes of the assemblies. The containers are filled with a non-toxic gas under pressure, consisting of Freon, pyrethrum and sesame oil, to be sprayed into tents or foxholes by soldiers, killing bugs or insects, to protect the men from disease. The joints in the containers must be strong and tight inasmuch as the Freon is very difficult to hold. Typical of these insecticide bombs is the one shown, brazed by the Salkover Metal Processing Co., jobbers in furnace brazing with plants in Chicago and Long Island City, N. Y., for the Armstrong Engineering Co. and the Tetco Co., both of Los Angeles.

Five joints are brazed in one trip through the furnace, thus contributing to low overall cost and uniform

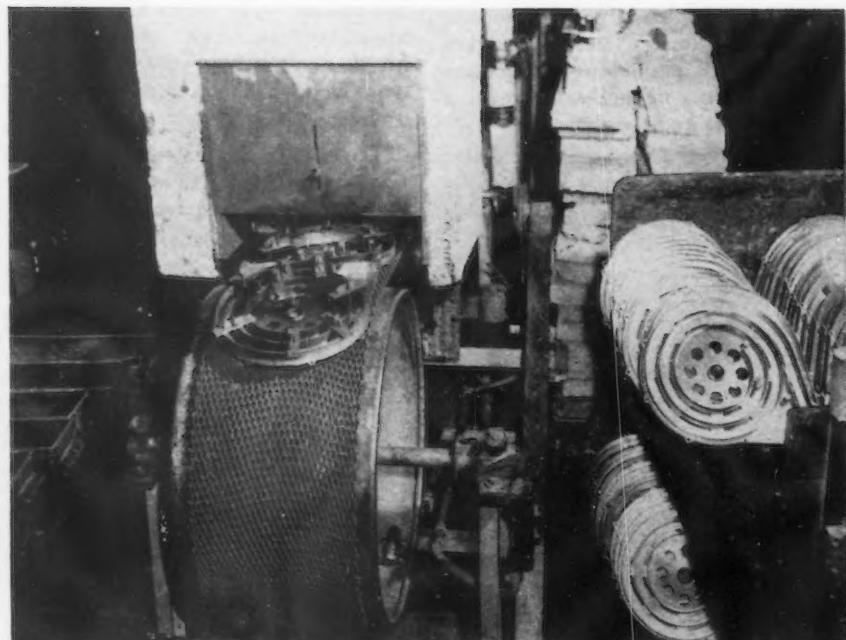


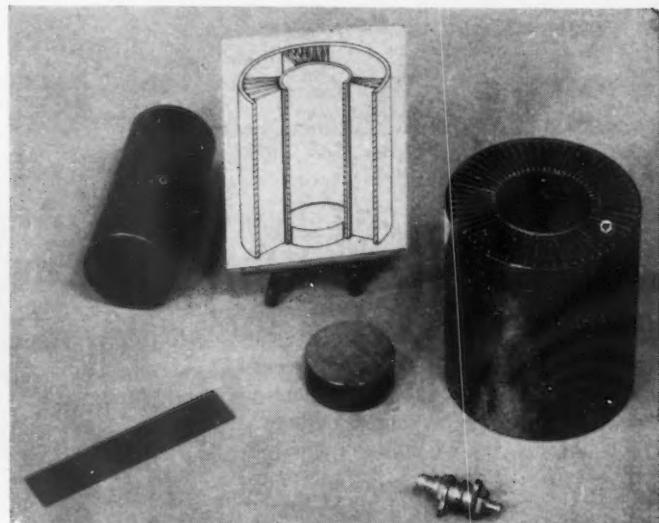
FIG. 6—Completely brazed magazine end plates, with clamping fixtures, emerging from discharge end of mesh-belt conveyor type copper brazing furnace.

○ ○ ○

RIGHT

FIG. 7—All-copper cooling radiator for transmitter tubes, furnace brazed with eutectic mixture of copper oxide and silver oxide powders in hydrogen atmosphere.

○ ○ ○



quality. The punctureable cap is brazed into the dispensing tube, the tube is brazed to the valve, the valve is brazed to one cup, the two cups are brazed together at the midseam and the tail fitting is brazed into the other cup. After brazing, the containers are tested at 200 lb. pressure with carbon dioxide gas and the bonds are found to be uniformly tight. By maintaining snug fits in the assemblies before brazing, which is very important, no trouble is encountered in holding the Freon without leakage after shipment. Also, it is felt that the uniform ductility of the metal after furnace brazing, without brittleness at or near the bonds, is a definite advantage.

Copper Creeps Long Distances

A unique furnace brazed assembly is the end plate for the magazine of the Oerlikon 20-mm. anti-aircraft gun. Fig. 5 shows the rear-plate assembly, made up of seven pieces, all copper brazed together in one pass through the furnace. The rear plate is a punching made from cold rolled SAE 1010 steel with spiral grooves swaged to accommodate two spiral guides rolled and formed from SAE 1020 coil stock. A journal or flanged ring is pressed into the center of the rear plate and staked, then two stop pins are riveted in place. The rear attachment block,

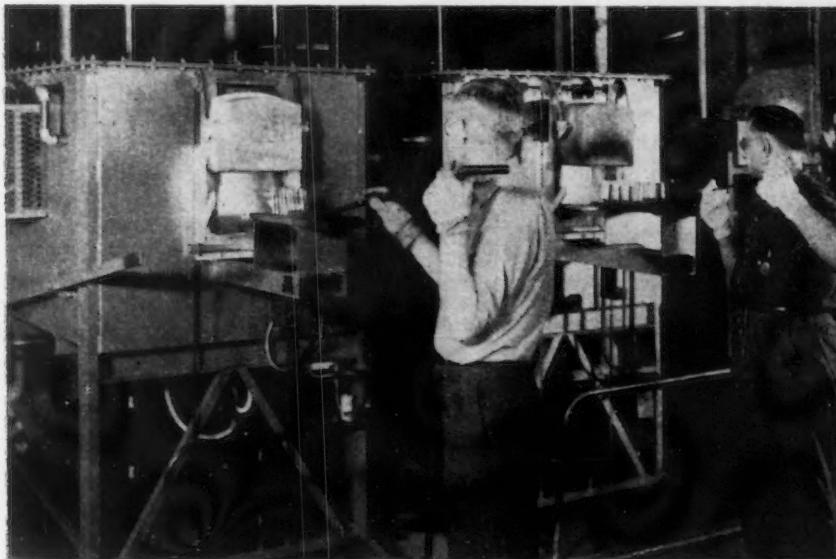
● For basic data on the fundamentals of the process, the reader is referred to the following articles by Mr. Webber which have appeared in THE IRON AGE: "Electric-Furnace Brazing: Where and Why to Use It," Sept. 8, 1938, p. 34; "Holding and Supporting Assemblies in Electric Furnace Brazing—I," Sept. 15, 1938, p. 30; "Holding and Supporting Assemblies in Electric Furnace Brazing—II," Sept. 22, 1938, p. 46; "Electric-Furnace Brazing, Capillary Attraction and Wetting Action Explained," Nov. 3, 1938, p. 30; "Limiting Creep of Furnace-Brazing Metals (With Data on Removing Copper after Brazing)," Nov. 10, 1938, p. 44; "Applying Electric-Furnace Brazing Metals," Nov. 24, 1938, p. 28; "Selecting Furnace-Brazing Metals and Fluxes," Dec. 8, 1938, p. 48; "High Strength of Furnace-Brazed Joints Explained," Dec. 29, 1938, p. 30; "Furnace Brazing of Cast Iron (With Notes on Causes of Distortion of Furnace Brazed Assemblies)," Feb. 2, 1939, p. 55; "Factors Affecting Selection of Furnace-Brazing Equipment," March 16, 1939, p. 30, and "Remedies for Furnace-Brazing Ailments," April 6, 1939, p. 46. The complete series is available in reprint form from the General Electric Co., Schenectady.

which is a forging of SAE 1022 steel, is projection-welded to the back of the plate. Then the spiral guides are laid in the grooves and locked in place by wedge-type clamps.

Capillary Effect

Almost unbelievable to those without furnace brazing experience is the method in which the brazing metal is applied and the results obtained. To braze the spiral guides to the rear plate, only nine small copper "hairpins" about $\frac{3}{4}$ in. long, made of 0.102 in. wire, are hung over the top edges

of the spiral guides. Wire rings are placed over the journal and stop pins, and coils of copper wire are placed in two holes in the plate directly over the rear attachment block. When the hairpins melt in the controlled atmosphere brazing furnace, the copper runs down the sides of the spiral guides and into the grooves, then creeps around the joints by capillary attraction, in some cases as far as 10 in. (not an unusual distance), leaving smooth, neat fillets all the way. The other rings and slugs also melt and



ABOVE

FIG. 8—Two box-type electric furnaces with molybdenum heating units for 2400 deg. F. maximum operating temperature, used for silver brazing tube radiators (Fig. 7), also for copper brazing, normalizing and annealing, and for removing certain gases from metal parts.

• • •

RIGHT

FIG. 9—Assembly of steel fittings composed of 28 pieces, copper brazed in a single furnace operation.





FIG. 10—Operator tying copper wires around fittings tack welded to tubes, preparatory to furnace brazing in controlled atmosphere electric pit-type furnace.

solidly bond their adjoining members together.

Fig. 6 shows the discharge end of a mesh-belt conveyor-type copper brazing furnace at the National Cash Register Co., Dayton, Ohio. Brazed end plates with locking clamps in place are shown emerging from the exit end of the cooling chamber. After the clamps are removed, the end plates are stacked in carriers as shown at the right.

The mesh-belt furnace is similar in arrangement to the box-type furnace previously shown, in that it has a heating chamber and cooling chamber, both with controlled atmosphere. However, it differs in that it has a heat-resisting alloy wire mesh conveyor and pulleys at both ends. Thus, work is loaded directly on the conveyor and carried continuously through the furnace at a speedy speed, the rate of this speed being adjustable over a 6:1 range by means of a

Reeves speed changer on the drive mechanism.

Silver Brazing Copper Parts

Fig. 7 shows an all-copper cooling radiator for vacuum tubes used in transmitters. It is an ingenious arrangement of an outer shell, inner shell, plug and 60 fins, held in position with cast-alloy fixtures and brazed together with an eutectic mixture of copper oxide and silver oxide powders mixed with water and applied at the joints with a brush. The assemblies are brazed at a furnace temperature of 1640 deg. F. Fifteen of them are loaded in a tray and charged into one of the box type, controlled atmosphere electric furnaces (Fig. 8). The tray rests in the heating chamber about 18 min. and is then pushed into the cooling chamber. The assemblies come from the furnace with uniformly strong, tight bonds, having good

FIG. 11—After brazing, the assembly shown in Fig. 10 now has uniformly tight bonds, smooth, neat fillets and clean, bright surfaces.



thermal conductivity, and no scale or flux removal is required. The assembly shown in Fig. 7 was made by General Electric X-Ray Corp., Chicago, and the box type brazing furnaces, Fig. 8, are installed in that plant. These furnaces have molybdenum-rod resistors for 2400 deg. F. maximum operating temperature. Similar ones have been built for 2750 deg. F.

Another assembly which illustrates the advantages of fabricating with the furnace-brazing process is the periscope sight tube, or a tube with various fittings, Fig. 9. This assembly is made up of 28 pieces, all copper-brazed together in one operation. The main piece is a section of SAE 1040 tubing, about 3% in. o.d., 1/8 in. wall thickness. On it are assembled four SAE 1020 forgings, one steel casting, four sleeves made from short sections of tubing, and a number of pads, brackets, bosses, etc., made from machine steel. The overall length of the assembly is about 68 in.

Tack Welded First

The various component parts are tack-welded in place, as shown in the close-up view in Fig. 10. This photograph shows the copper wires being tied around the parts preparatory to brazing. After the assembly has been brazed in a retort in a pit-type controlled atmosphere furnace, it has the appearance shown in Fig. 11. The copper has run throughout all joints, firmly and tightly bonding the various fittings to the tube, and leaving smooth, neat fillets at all junctions. It is highly important that the bonds are not only strong but that they are airtight, and the furnace brazing process has been found ideally suited to this application in these respects. The assemblies are pressure tested after brazing and a leaky joint is quite rare. With snug metal-to-metal fits and good tack welding technique to hold the members close together, it has been demonstrated in production that the copper brazed joints are uniformly strong and tight. The above operations are carried on in one of the General Electric Co.'s plants.

[Other examples of furnace brazing applications and developments in furnace equipment will be illustrated by Mr. Webber next week.]

Equipment and Material For Precision Casting

AFUNDAMENTAL advantage that is claimed for induction melting of small metal charges as compared with other methods is the uniform temperature throughout the charge obtained by inducing electric currents through it. Another advantage is the stirring effect on molten metals, particularly important in the case of alloys. High frequency induction heating can give an extremely high energy input to the mass to be melted. This immediately causes rapid melting with an inherent reduction of oxidation and contamination, and with the introduction of a reducing atmosphere surrounding the melt, practically no scale or slag is present.

The basic components of a high frequency induction furnace are a crucible and a coil of copper tubing through which cooling water circulates. This coil is placed around the crucible as close as constructional and temperature limitations permit. The metal charge—or the crucible itself, if it is of electrically conducting material—acts as a self-loaded secondary winding of a transformer of which the induction coil is the primary winding. The coil is energized by a generator converting the low frequency current from the a.c. power supply line into a current of high frequency usually within the range of 50 to 500 kilocycles. The drawing, Fig. 9, shows a typical cross-section through an induction furnace with a crucible of the non-conducting type.

Induction heating, with its ability to concentrate large amounts of energy in small masses, gives advantages not obtainable with other methods of melting from point of view of centrifugal casting. The melting crucible can be made in any desired shape or form to fit into the casting procedure and moreover, can be placed in any desired position with respect to the mold. Thus, it is practical to mount the melting crucible adjacent to the mold on the rotating arm which gives the centrifugal force to the molten metal, and have the heating

... In this second and concluding article, induction heating furnaces and centrifugal casting machines are described.

By J. ALBIN

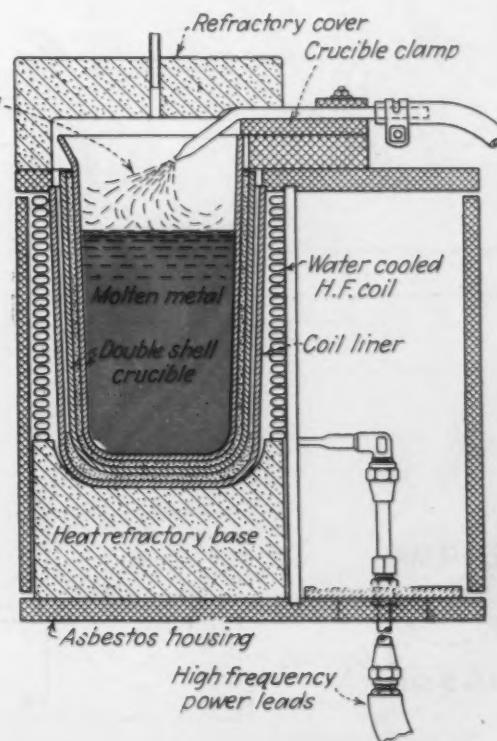
coil mounted in such a way that it can be brought over the crucible during the melting cycle and removed when the casting operation is taking place.

Manufacturers of induction heating units have experimented with methods that make the maximum use of the flexibility and the cleanliness of the induction process for centrifugal casting.

Several suggested procedures under development by the Induction Heating Corp., 389 Lafayette Street, New York 3, are here described.

Multiple stations can be arranged so that one crucible is heating while others are being emptied, thus guaranteeing full utilization of the equipment involved (Fig. 10). This is only

FIG. 9—Cross-section of an induction heating furnace with protective gas.
Courtesy of Ecco High Frequency Corp.



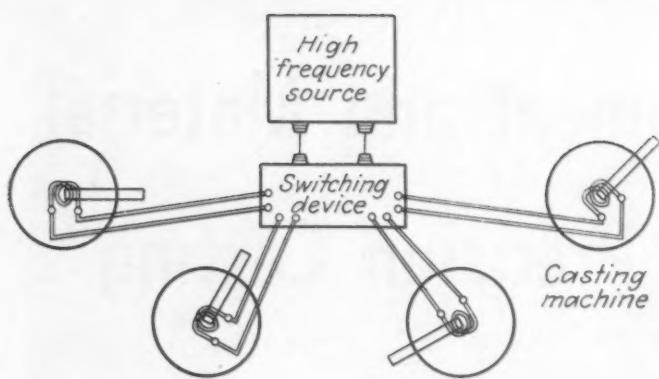


FIG. 10—Diagram of proposed multiple unit operation from single high frequency generator.

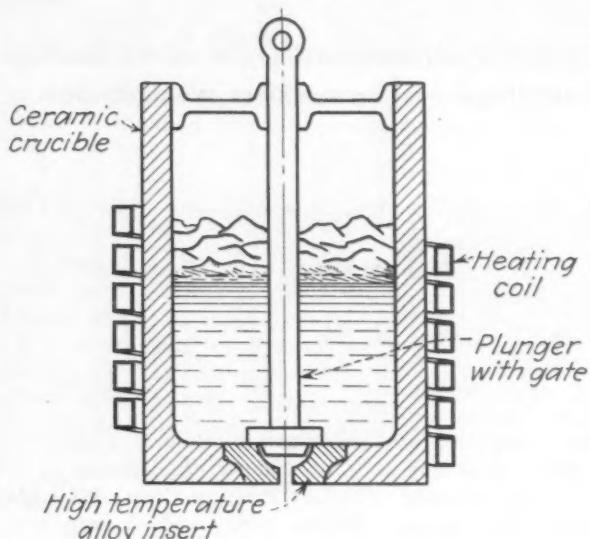


FIG. 11—Cross-section of a suggested bottom tapping crucible to allow new metal to be fed continuously in top of crucible while clean superheated metal in fluid state.

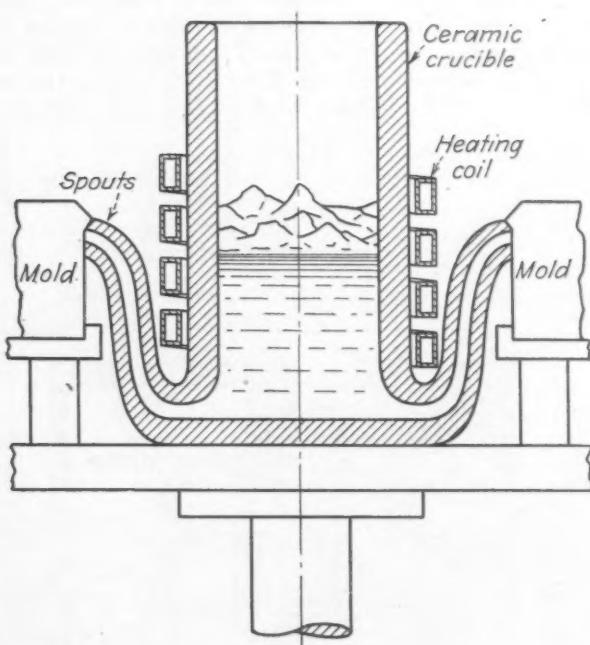


FIG. 12—Principle of the spout type crucible which permits metal to be heated even when flow has started. Metal begins to rise in spout as rotation commences.

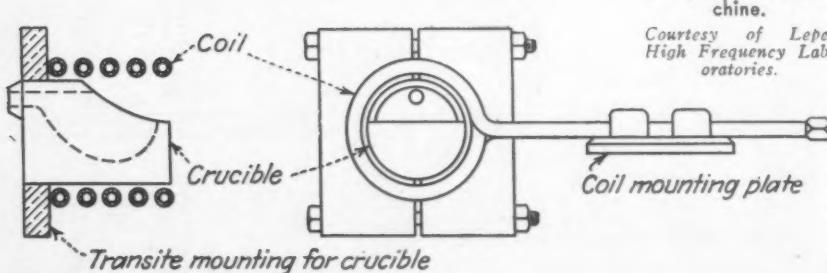


FIG. 13—Method of locating a removable induction heating coil about crucible in a centrifugal casting machine.

Courtesy of Lepel High Frequency Laboratories.

one example of the many techniques which can be developed. Many manufacturers have preferred to keep the melting setup apart from the casting apparatus, and have used larger crucibles to feed many molds. It has been possible in such cases to use bottom tapping crucibles, Fig. 11, which allow new metal to be fed continuously in the top of the crucible while clean superheated metal in the fluid state is drawn off from the bottom.

Multi-Spout Crucible

Another adaptation of these principles has been the multi-spout crucible mounted in the center of the spinning platform whereby the heating coil, surrounding the large crucible mounted on the axis of rotation, could be left in place during the spinning and casting part of the procedure, and so permit the metal to be heated even when the flow has started. The crucible for such an installation much resembles the shape of a spider, each leg being a spout butted against its individual mold, numbering in practice, six, eight or even ten (Fig. 12). These spouts have a rise in them after they leave the body of the crucible so that when the crucible is at rest, the charge of molten metal does not flow from the spouts. The heating coil is so arranged that heating also takes place within the spouts, preventing metal from solidifying in them. Upon rotating, however, the molten metal tends to flow outward against the sides of the crucible, and this pressure causes the melt to rush up into the spouts and from there, into the molds. More metal is added to the crucible, and during the short interval of time required for it to melt, new molds are placed in position and the process is ready for another run on a real production basis.

A method of mounting a crucible for melting when centrifugal casting has been developed by another induction heating company and is shown in Fig. 13. Immediately after the melt is secured, the coil is slipped away from the crucible and the centrifuge is released.

Induction Furnaces

The Ajax Electrothermic Corp., Division of the Ajax Metal Co., Trenton 5, has a line of converters and furnaces to handle melts from 2 lb. up to 200 lb. These are as follows:

3 kw. converter, usual frequency about 50,000 cycles, maximum recommended steel melt (carbon free) —2 lb.

6 kw. converter, usual frequency about 40,000 cycles, maximum recommended steel melt (carbon free) —4 lb.

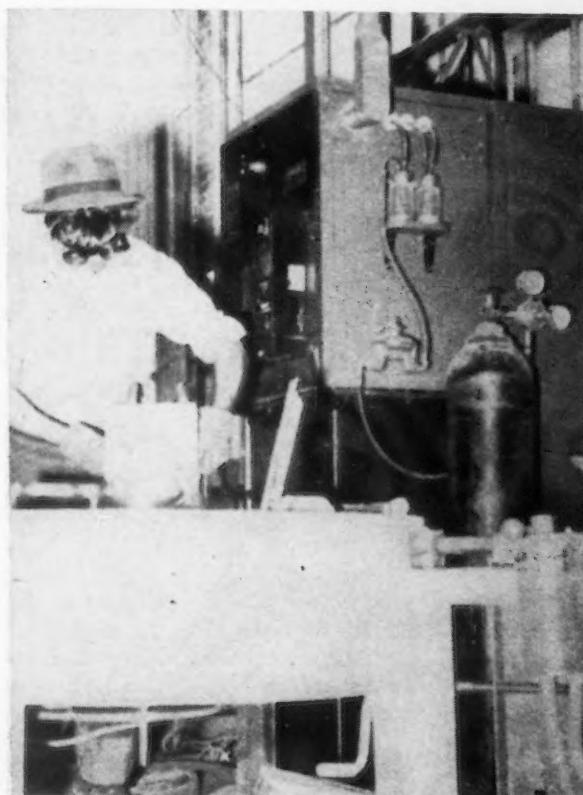
20 kw. converter, usual frequency about 25,000 cycles, maximum recommended steel melt (carbon free) —30 lb. (see Fig. 14).

40 kw. converter, usual frequency about 20,000 cycles, maximum recommended steel melt (carbon free) —50 lb.

Generator powered equipment rated 100 kw., 3000 cycles, with 200 lb. furnaces.

Generator powered equipment rated 60 kw., 2000 cycles, 150 lb.

A small furnace for hand pouring used with the A 20 kw. Ajax Northrop converter is illustrated in Fig. 15. This photo was taken in the plant of Trifari, Krussman and Fishel, Inc., 387 Charles Street, Providence 4,



where 5, 12 or 17 lb. crucibles are used with the A 20 kw. converter depending upon the charge required. The melting time for 5 lb. of steel is approximately 6 to 8 min. The castings produced at the present date at this plant range from a fraction of an ounce to over 2 lb. in non-ferrous alloys and to 1 lb. in ferrous materials. The casting machine shown is of company design and manufacture.

The company has on order an Ajax motor-generator type melting unit capable of melting 150 lb. of steel at one time. When this is installed, the company plans to split the heats into a battery of casting machines as a method for maintaining product uniformity. In Fig. 16 is illustrated a generator powered Ajax Northrup

• • •

RIGHT

FIG. 14—Metal being poured from the 30 lb. capacity Ajax induction heating furnace with trunnion mount.

• • •



LEFT

FIG. 15—Ajax furnace permitting hand pouring into centrifugal casting machine. In the background is an Ajax 20 kw. converter.

• • •

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FIG. 16—An Ajax Northrup furnace with a melting capacity of 100 lb. The molten metal will be conveyed by hand ladle to the centrifugal casting machine in the foreground.

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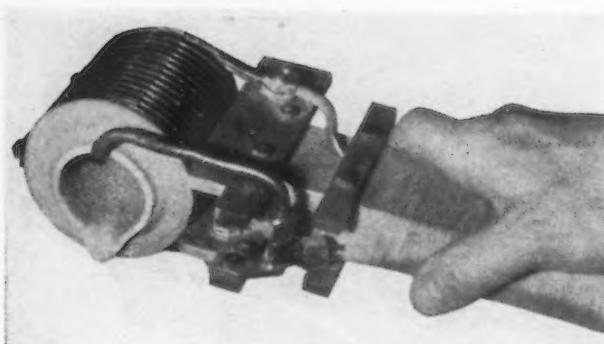


FIG. 17 — Ecco ladle type induction furnace which melts 10 oz. of steel in 45 sec. There is a protective gas outlet at top edge of crucible.

furnace installation of 100 lb. capacity.

The ladle type induction furnace is uniquely fitted for pouring the melt into the casting machine.

In Fig. 17 is illustrated a 1 lb. ladle furnace produced by Ecco High Frequency Corp., 7020 Hudson Boulevard, North Bergen, N. J. The melting time for 10 oz. of steel with this ladle furnace is 45 sec. with a 16 kw. input.

The low voltage and current form produced by the Ecco high frequency converters makes it possible to handle the ladle furnace as shown in the illustration, without danger of shock. While the metal is being melted the furnace rests in a Transite cradle which may be placed on a furnace table or other suitable support. The crucible is held in the coil by a locking member fastened with nut and can be replaced in a few seconds. Since the crucible assembly comprising crucible, insulation and coil liner is self-contained, no insulating packing is required. Provisions are made for maintaining a curtain of hydrogen or other preferred atmosphere above the melt.

Ladles are equipped with Ecco double-shell alumina crucibles for steel melting and with carbon-graphite crucibles for melting copper, brass or precious metals which are not subject to carbon contamination. For platinum and other metals with high melting points zirconia crucibles are

available with liners of fused quartz protecting the heater coil.

Ecco ladle furnaces are made in three steel melting capacities: 1, 1½, and 2 lb.



FIG. 18 — Lepel ladle type furnace of 5 lb. steel capacity.

standard sizes—Model F30 with a capacity of 17 lb. of steel and Model F42 with a 25 lb. capacity.

The Lepel High Frequency Laboratories, Inc., 39 West 60th Street, New York 23, manufacture an induction furnace for manual operation which comes in several sizes. Fig. 18 illustrates a ladle type furnace having a capacity of 5 lb. of alloy steel. For heavier melts of about 30 lb. a furnace with tilting table can be had.

Current for these furnaces is supplied from standard Lepel high frequency converters of the quenched spark gap type, of variable frequency, so that inductor coils of different sizes and characteristics can be accurately matched. The converters used with Lepel furnaces come in capacities of

7½, 15 and 30 kw. The 30 kw. unit is used with the 30 lb. furnace.

Power requirements depend on the amount of charge, the kind of metal and the time of heating desired. Non-ferrous metals of copper base alloys generally take from three to four times as much energy as a similar mass of iron.

The following are examples of melting periods: Using a Lepel 15 kw. input converter, 2 oz. of stainless steel melt in 15 sec. Using a Lepel 30 kw. input converter, a 1 lb. charge of steel requires about 1 min. for melting.

Lepel provide ceramic and graphite type crucibles. The latter is preferred in the case of non-ferrous melt; the ceramic is generally used for melting both magnetic and non-magnetic steels.

To prevent oxidation, especially in the case of steels, short heating cycles are imperative. No trace of oxidation was observed in the aforementioned 2 oz. charge of stainless steel. Where longer time cycles are involved, blanketing with a non-oxidizing gas is an advantage.

TABLE I
Recommended Crucibles for Various Metals

| Metal | Weight I per Cu. In. Lb. | Melting Point Deg. F. | Type of Crucible Recommended |
|--------------------------------|--------------------------|-----------------------|------------------------------|
| Steel (1 per cent C) | 0.282 | 2602 | Alumina |
| Copper | 0.310 | 1981 | Clay-graphite |
| Nickel | 0.300 | 2646 | Alumina or magnesia |
| Aluminum | 0.092 | 1218 | Clay-graphite |
| Platinum | 0.720 | 3191 | Zirconia |
| Palladium | 0.433 | 2831 | Zirconia |
| Gold | 0.697 | 1945 | Clay-graphite |
| Silver | 0.378 | 1760 | Clay-graphite |

Fig. 19 shows a Lepel induction heating unit and its connection with a coil for heating a centrifugal casting crucible.

Melter and Caster

The Thermotrol, a combination melting and casting machine is produced by J. F. Jelenko & Co., Inc., 136 West 52nd Street, New York 19. Originally developed some years ago for the dental trade, the model illustrated in Fig. 20 incorporates changes in size and other features which make the present machine suitable for the commercial field.

The machine consists of a rotating arm which is balanced on a center pivot. Towards one end of this arm is an electrical muffle heating unit which serves to melt the metal to be cast. On the outer end of this heating unit and tightly clamped against it, is the flask which contains the mold into which the cast metal is to be forced.

ticularly true of small castings which solidify very rapidly and which must force the gases out of the mold ahead of the molten metal at a very high rate of speed. It is thus seen that the possibility of controlling this casting temperature and of studying its effects, is important to the soundness of the casting. It is a feature of Thermotrol.

The second factor which Thermotrol controls very well is that of the atmosphere surrounding the molten metal during melting. The carbon crucible provides an almost perfect deoxidizing atmosphere, due to the affinity of the carbon for any oxide which may be present in the crucible. This protects the metals against oxides which might form during heating and as a result obviates inclusions in the casting.

Available for general commercial use is Model J-100 having a capacity of 0.6 cu. in., equivalent to 0.20 lb. of

phosphor bronze. For larger castings, there is Model I-3 having a capacity of 2.2 cu. in., equivalent to 0.70 lb. of metal. The smaller model takes a 3.5 in. outside diameter flask; the larger, a 5 in. flask.

The combination of an electric arc melting furnace and a pressure casting unit is embodied in the machine developed and patented by the Austen Laboratories, Inc., New York, and used by this company for casting turbosupercharger buckets (Fig. 21). This type melter and caster combination has not been made available, at this date, as an item of standard equipment.

Casting Crucibles

The substance to be melted and the temperature to be reached determine the type of material of which the crucible should consist. Non-conducting crucibles are made of such refractory materials as alumina, magnesia, silica, zirconia, etc., which contain no carbon. They do not absorb energy from the electromagnetic field created within the induction coil so that they are heated only through contact with the metal charge.

Crucibles made from electrically conductive materials such as carbon, graphite, platinum, molybdenum, etc., absorb most of the high frequency energy and the charge is heated primarily by thermal conduction. The carbon and graphite crucibles are usually chosen for melting non-ferrous metals or alloys which do not absorb carbon or are detrimentally affected by it.

The maximum operating tempera-

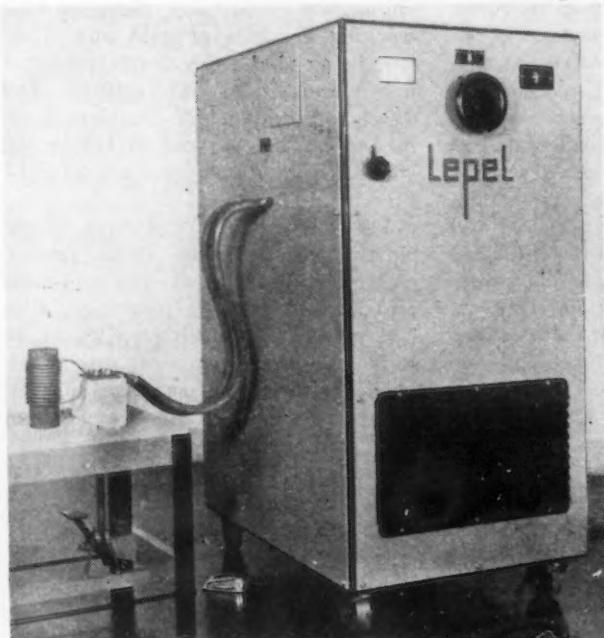
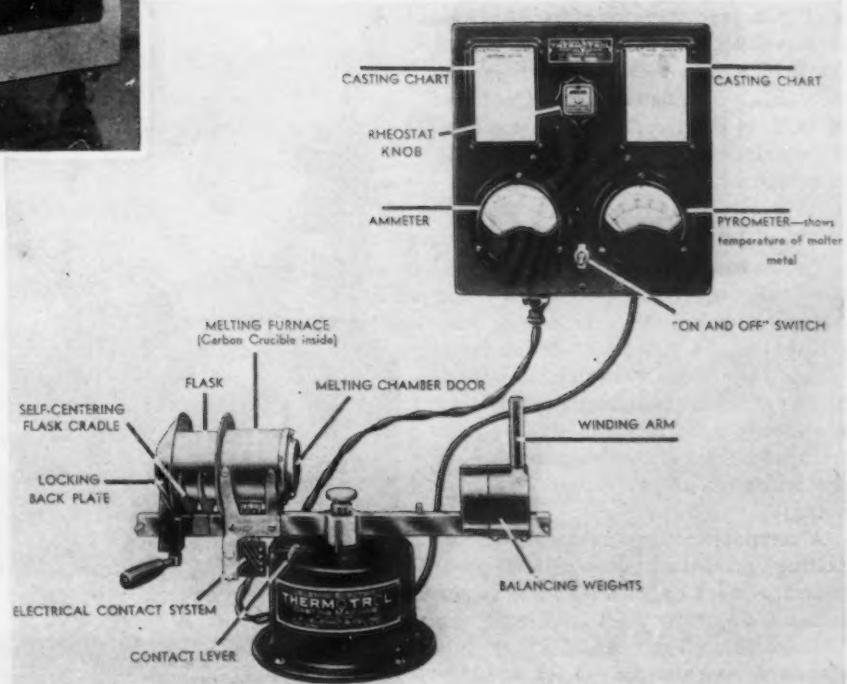


FIG. 19—Lepel induction heating unit showing connection to coil.

BELOW

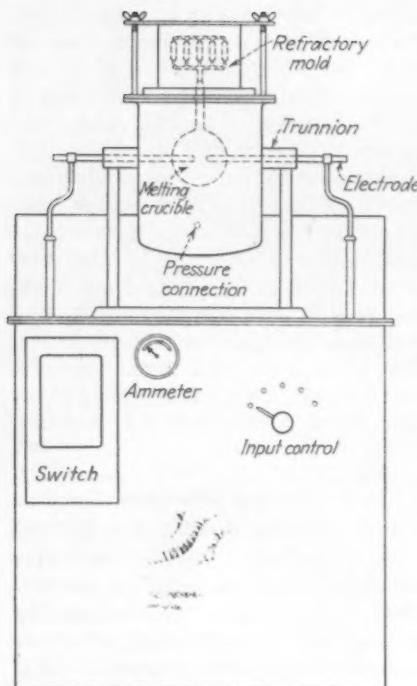
FIG. 20—The Jelenko Thermotrol combines in a single unit an electric muffle furnace and a centrifugal casting machine.



The arm is used to wind the spring motor in the base.

Connected to a source of electric power, 120 volts a.c. or d.c., the time required to bring the muffle up to a casting temperature from 1000 to 2000 deg. F. is about 7 min. The rate of flow of current and the temperature at the surface of the crucible are both indicated on a meter on the panel board. The rate of current flow is regulated by a rheostat.

There is considerable data in existence to show that the strength and ductility of the casting are affected by the temperature at which the metal is thrown into the mold. This is par-



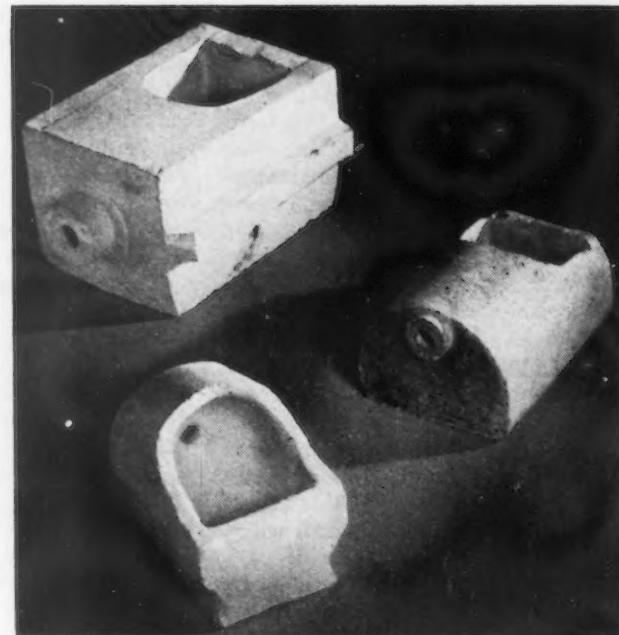
LEFT

FIG. 21—Sketch of the patented Austenal electric arc casting machine. The trunnions are pressure packed where the carbons pass through so as to maintain the air pressure when the melt is poured. This is done by tilting the crucible downward.

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RIGHT

FIG. 22—Samples of ceramic crucibles furnished by Alexander Saunders & Co., New York, for use in a centrifugal casting machine. Note the inner rounded construction about the orifice.



U.S. Patent No. 2,125,080

tures for which crucibles of various types are suitable are given in the table below:

| Material | Deg. F. |
|--------------------|---------|
| Alumina | 3092 |
| Graphite (clay) | 3002 |
| Graphite (carbon) | 3002 |
| Graphite (Acheson) | 5432 |
| Magnesia | 3632 |
| Quartz (fused) | 2732 |
| Silica | 2912 |
| Zircon | 3632 |
| Zirconia | 3992 |

The types of crucible recommended for certain metals, the melting points and the specific weights of these metals are given in Table I, the data for which has been supplied by the Ecco High Frequency Corp. Crucibles of various forms and shapes are used in centrifugal casting machines, some of which are illustrated in Fig. 22.

Casting Machines

The casting of the molten metal into the cavity of the hot investment can be accomplished by pressure or centrifugally. At the time of this writing, information available on standard commercial equipment for casting has been on equipment of the centrifugal type (with the exception of the Austenal pressure caster already noted).

A compact motor driven centrifugal casting machine suitable for small quantity work is offered by Thomas J. Dee & Co., 1900 West Kenzie Street, Chicago 22. The capacity of this standard machine is 14 oz. and is

illustrated in Fig. 23. A large arm that will accommodate a larger crucible permitting casting up to 30 oz. is available on special order.

The machine is so constructed that two castings can be made at the same time. The centrifugal force exerted by the machine has been calculated as approximately 50 times gravity. Several flasks, ranging in size from 1 in. diameter and 1 in. length, 2½ in. and 4½ in. diameter, up to 5 in. in length, are supplied. The Dee company supplies a patented crucible that is claimed to keep the metal clean and free from oxidation. Each can be used for a number of melts and are available in Carborundum, graphite and "special" for casting platinum. Crucibles may be heated in a small

gas fired furnace that is located close to the machine. Although the machine was originally designed for working castings of gold and silver it is being used today for ferrous and non-ferrous industrial castings. The weight of the machine complete is 50 lb. and can be operated on 110 or 220 volt a.c. The dimensions are 24 x 24 x 18 in.

The Ecco High Frequency Corp., North Bergen, N. J., is at present making a single flask and a 4-flask centrifugal casting machine. The Ecco Model M1 machine, Fig. 24, is suited for the economical production of dense precision castings of any metal, particularly steel and other high melting point alloys. This unit is designed to accommodate flask

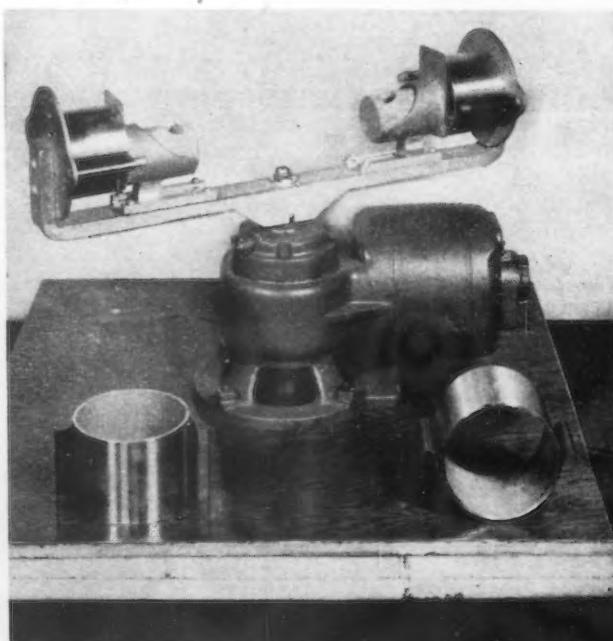


FIG. 23—Motor driven 2-flask centrifugal casting machine manufactured by Thomas J. Dee & Co., showing the position of the crucibles relative to the flasks which are retained on the revolving arm by spring straps.

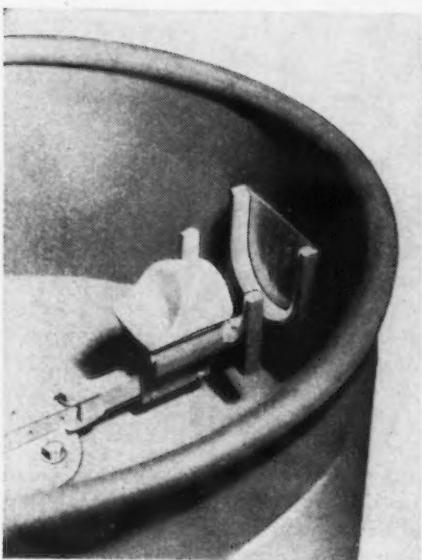


FIG. 24—Showing the pivot arm mounting of crucible in an Ecco single flask centrifugal casting machine. (Flask not shown.)

molds ranging in size from 2 to 5 in. in diameter, and from 2½ to 4½ in. in length. The rotating assembly is driven by a 3-phase high torque ball bearing motor through a variable speed drive which may be varied progressively from 260 to 520 r.p.m. by means of a speed selector wheel, permitting a straight line control of the centrifugal force developed.

Properly dimensioned holders are provided to secure the investment flask mold in position. The injector funnel slides along the arm which automatically positions itself for the various mold lengths. Accurate balance is obtained by a sliding counterweight and the pivoted arm mounting, which is locked during operation.

Sequence of operation consists of placing the preheated investment flask mold into its holder, pouring the metal into the preheated injector funnel and pressing the motor starting switch. The metal is discharged under pressure, by centrifugal force, into the mold.

The Ecco Model M2 centrifugal casting machine, Fig. 25, accommodates four flask molds ranging in size from 2½ to 4 in. in diameter, and from 3 to 6 in. in length. This unit was developed primarily for non-ferrous metals, although many ferrous castings are also being successfully produced with this model.

A steel disk with suitable mold holders and a refractory lined distributor is mounted on a vertical steel shaft which revolves on ball bearings. The rotating assembly is housed in a ruggedly constructed welded steel drum and angle iron frame protected by a cover mounted on hinges.

The speed of the mold disk can be varied between 260 to 520 r.p.m.

Sequence of operation consists of placing a preheated metal distributor into the guide at the center of the disk clamping the investment flask molds in the holders and closing the cover. The motor switch is closed and the metal is poured through a preheated funnel into the casting machine.

Ecco is developing an automatically controlled 2-station machine, which is a setup comprising one converter and two centrifugal casting machines so that the charge can be prepared

in one machine while the charge in the other is being heated, thus utilizing the capacity of the machine as fully as possible.

A vertical centrifugal casting machine which can be used to produce a wide range of sizes of castings and which can accommodate molds up to 24 in. in diameter and up to 12 in. in height, is the Model J machine built by the Centrifugal Casting Machine Co., Tulsa, Okla.

The machine is completely integrated on a single base so that it can be readily moved as a unit (Fig. 26). For permanent installation the machine may be bolted to the foundation through holes provided in the base. The speed of rotation of this machine can be adjusted by using the proper set of sheaves to suit the particular size of casting being produced. A guard, adjustable in height, protects the workman from spattering metal.

It may be noted that the fixture which fits onto the machine accommodates four flasks, with a ceramic center pouring block. In operation the machine is brought up to the desired spinning speed and the metal poured into the central pouring block, which has four small orifices which equally distribute the metal to each of the four molds. Each mold, of course, would contain a multiplicity of mold cavities to make a number of castings. The design of the pouring block is such that any slag which is poured in with the metal would float and thus go into the mold last and not actually go into the casting cavities. Using this type of equipment, very high rates of production can be obtained. The company manufactures the fixtures for flasks in four different sizes, 3, 4, 5 and 6 in. in diameter. Flasks made from No. 16 gage stainless steel are available in the foregoing diameters, and in lengths to 7 in.

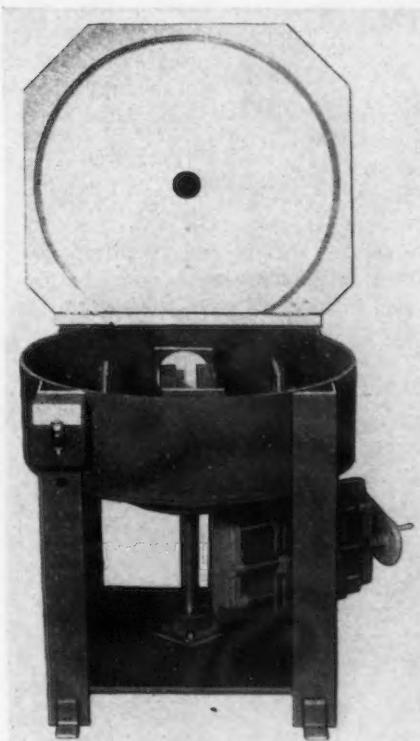
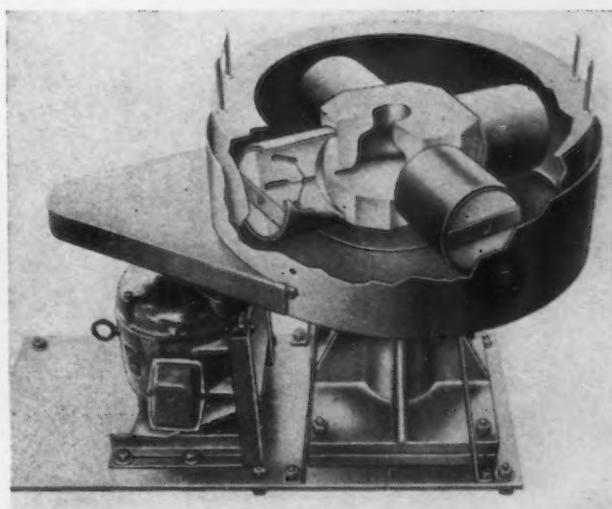


FIG. 25—Ecco 4-flask centrifugal casting machine operated by a 1/2 hp. motor. Motor not shown on base.

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FIG. 26—Cut-away view of Model J centrifugal casting machine made by the Centrifugal Casting Machine Co., showing flasks with investment cavities to receive metal cast from ceramic pouring block. Note that flasks fit into flask carriers welded to a fixture table.

• • •



Fatigue Resistance of NE Steel Shafts

...One of the drawbacks in the use of NE steels for highly stressed machine parts has been the lack of adequate data on their fatigue resistance. Described herein are the tests made on NE 8949, NE 8744 and NE 9445 steels as compared to SAE 4340. Endurance limit ratings are given these steels for various degrees of stress concentration.

CONSIDER-
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experience is avail-
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By O. J. HORGER and
T. V. BUCKWALTER

Timken Roller Bearing Co., Canton, Ohio

ance of highly stressed machine parts made from SAE 4340 steel in the quenched and tempered condition. High static and fatigue strength properties combined with good ductility and deep hardenability characteristics has made the selection of this material especially attractive for de-

sign members of
large sections.
During the war,
however, many
cases have arisen
where it was found

necessary to use some National Emergency (NE) steel to replace the use of SAE 4340.

In practically all cases the design member is subjected to stress reversals in service and therefore adequate fatigue resistance must be provided in any NE steel substituted for

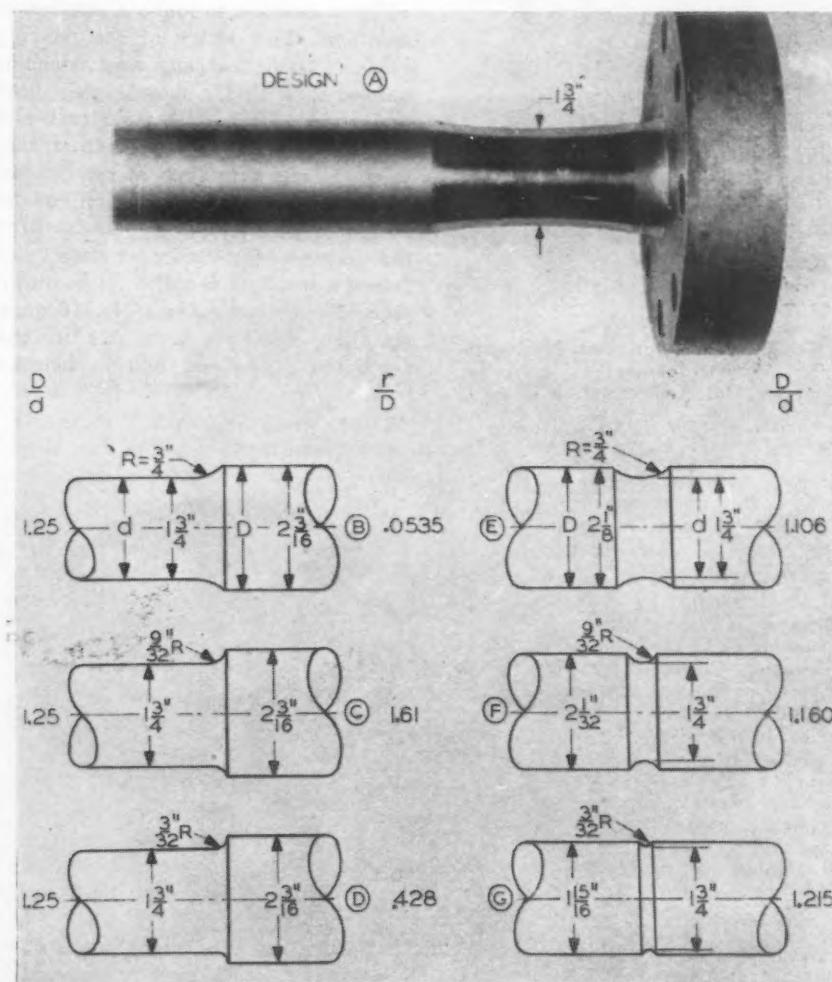
SAE 4340. There is a definite lack of such data relative to the fatigue resistance of various NE steels. For this reason the fatigue strength properties of NE 8949, NE 8744, and NE 9445 were investigated in comparison with SAE 4340 using test sections larger than usual.

The fatigue specimens used in these tests were $1\frac{1}{4}$ in. diameter at the critical test section instead of the usual $\frac{1}{4}$ in. diameter employed by the conventional R. R. Moore rotating beam specimen. Objection to data obtained on such small samples is not entirely confined to the size of the cross-section but also to the shape of the specimen. The conventional small fatigue specimen has no notches or stress raisers and represents what is usually termed a plain specimen; the surface contour of a longitudinal cross section is formed by a radius about 20 to 40 times the specimen diameter. This shape is one seldom attained in actual design members and the value of the fatigue resistance obtained may be termed "ideal" in that the value is too high. Small fatigue specimens are sometimes made with a circumferential V-notch having a relatively small radius at the bottom of the notch. Such a shape represents a high factor of stress concentration which leads toward a value of minimum fatigue resistance for any steel investigated. While some design members may actually have localized stresses approaching the severity simulated by such a notch, it may generally be avoided and is certainly considered poor design.

Specimens Simulate Good Design

Somewhere between these two extreme specimen shapes mentioned above lies a region which simulates good design practice. It is in this region that a knowledge of the fatigue resistance is of most value in the selection of steels and heat treatments for properly shaped design members. For this reason the fatigue strength was determined for seven differently shaped specimens, shown in Fig. 1, on each of four different steels. These seven designs may be divided into two general classifications. One group incorporated a fillet at the test section and is designated as designs A, B, C and D. Fillet radii in this group are $9\frac{1}{8}$, $\frac{3}{4}$, $9\frac{1}{32}$ and $3\frac{1}{32}$ in. The second

FIG. 1—Seven designs of the shafts investigated. Designs A, B, C and D have fillets with radii of $9\frac{1}{8}$, $\frac{3}{4}$, $9\frac{1}{32}$ and $3\frac{1}{32}$ in. respectively. Designs E, F and G have circumferential circular notches with radii equal to those of the fillets.



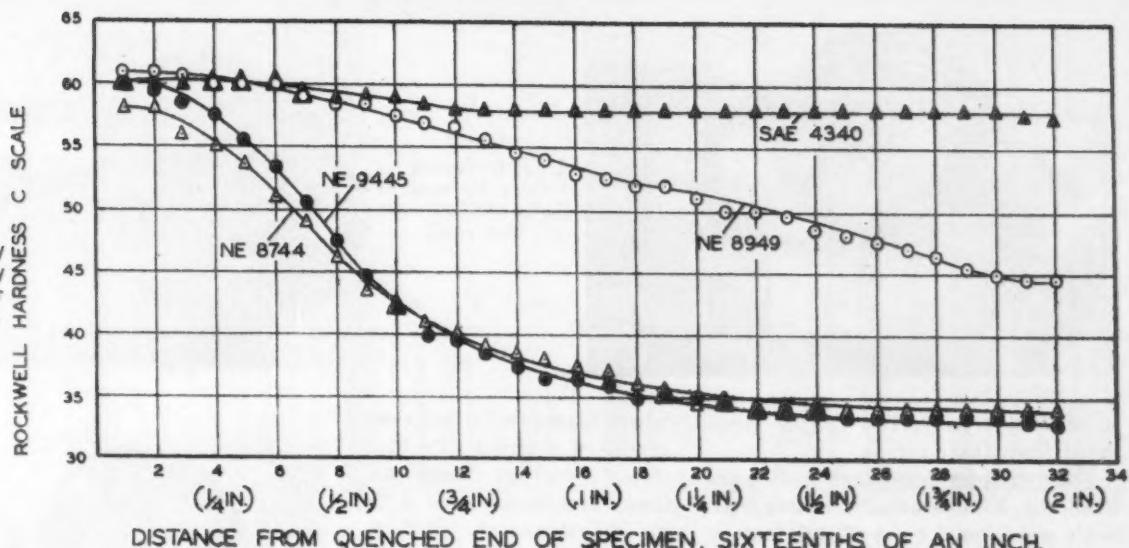


FIG. 2—Jominy hardenability curves of the four steels investigated.

group, identified as designs E, F and G, has circumferential circular notches with radii equal to the fillet radii. All designs of shafts had a head pressed on one end, with the test section located at least one diameter from the face of the hub, as shown for design

A in Fig. 1. The head was bolted to a rotating spindle and a cantilever load applied at the opposite end of the shaft during the fatigue test.

All specimens were taken from the same heat of steel for which the chemical analysis is given in Table I.

The NE 8744 and NE 8949 were both open hearth heats while NE 9445 and SAE 4340 were electric furnace heats. All heats were cast in 21-in. diameter fluted ingots in inverted hot top molds; ingot weight was about 6000 lb. Specimens were taken from 2 $\frac{1}{4}$

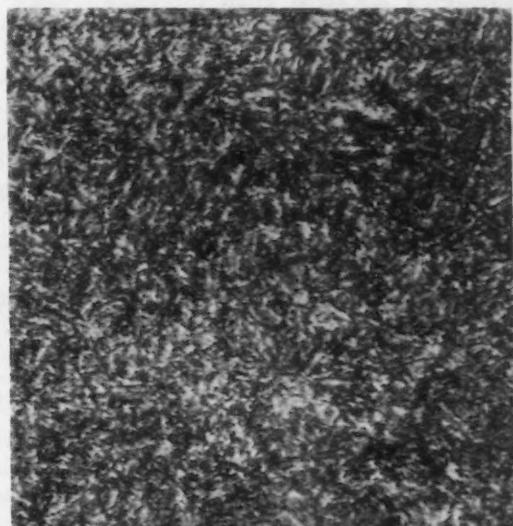
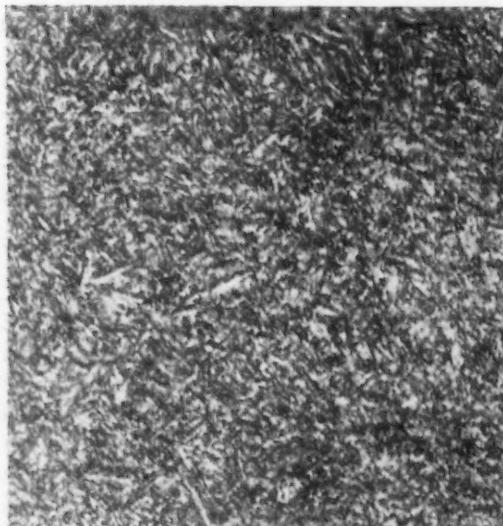
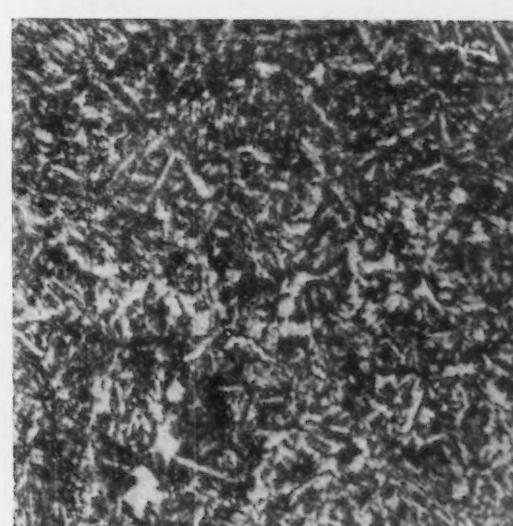
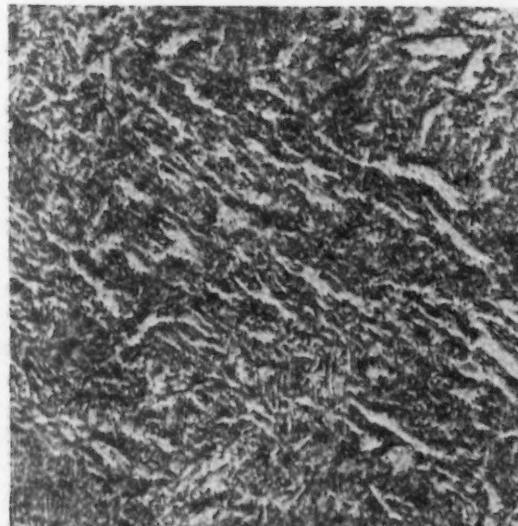


FIG. 3—Structure of fatigue test specimens taken near the surface at 1000 diameters. All samples were oil quenched from 1500 deg. F. into a full oil spray and tempered for 4 hr. to give a Brinell hardness number of 302 (31 Rockwell C). Above left: SAE 4340 tempered at 1100 deg. F. Above right: NE 8949 tempered at 1075 deg. F. Below left: NE 8744 tempered at 1025 deg. F. Below right: NE 9445 tempered at 1025 deg. F.



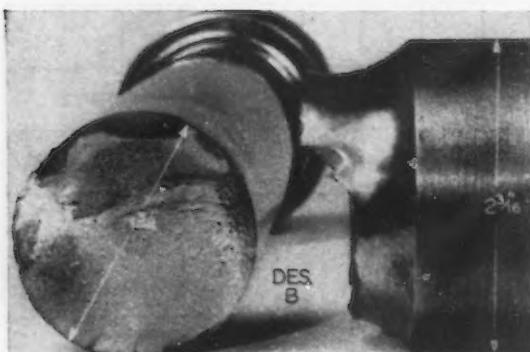
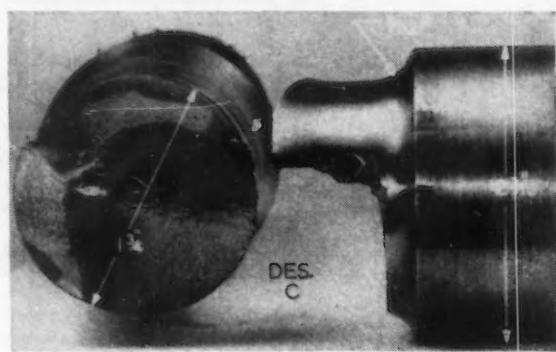


FIG. 4—Typical fatigue fractures of shafts with different fillet radii.



in. diameter hot rolled rounds processed from these ingots.

Four samples from each heat were used for a non-metallic rating; all heats were found to be of satisfactory quality with a rating of fairly good to fair. Table II gives grain size values obtained from McQuaid-Ehn samples on all materials in both the hot rolled and normalized conditions as well as oxidation grain size. Jominy hardenability characteristics of the four steels are plotted in Fig. 2. Physical properties shown in Table III were obtained on $\frac{1}{4}$ -in. tensile specimens machined from the outer surface layers at the large end of the fatigue specimens.

All fatigue specimens were quenched and tempered to the same nominal hardness of 302 BHN, 31 Rockwell C. All four steels were oil quenched from 1500 deg. F. into a full oil spray with an oil temperature of 72 to 92 deg. F. and then tempered for 4 hr. at the tempering temperature shown on the photomicrographs in Fig. 3. All specimens were contour machined to shape before heat treating and an allowance of $\frac{1}{16}$ in. stock on a side was made for finish machining after heat treating.

All specimens were polished circumferentially using a rotating canvas

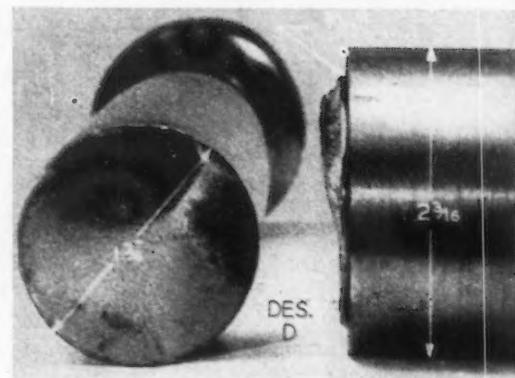
wheel loaded with different grades of alumina. Profilometer readings made on these specimens gave a 5 to 20 micro-inch surface finish.

Typical fatigue fractures are shown on Fig. 4 and the endurance limit values obtained in Table IV are based on running the specimens in rotating bending as cantilever beams for 30 million revolutions without failure. The fatigue values shown in Table IV are also shown graphically in Fig. 5.

The metallurgist and designer should be most interested in the range of fatigue values shown for designs B through G in Fig. 5. This region includes $\frac{3}{32}$ through $\frac{3}{4}$ -in. radii and simulates the stress concentration present in many well designed machine members. Theoretical stress concentration factors determined from photoelastic studies typically shown in Fig. 6 were about 1.2 for the $\frac{3}{4}$ in. fillet and 2.1 for the $\frac{3}{32}$ in. fillet.

Endurance Limit Ratings

An endurance limit rating may be established on these four steels for the various degrees of stress concentra-



G in accordance with the following which was deducted from Table IV.

| | Per Cent |
|----------|--------------------------------|
| SAE 4340 | 100 all conditions of geometry |
| NE 8949 | 94 max. to 25 min. |
| NE 8744 | 92 max. to 68 min. |
| NE 9445 | 85 max. to 75 min. |

tion expressed by designs B through G.

In this discussion little emphasis has been placed on the fatigue strength of design A which represents a plain specimen shape seldom occurring in design members. In fact the values given for design A in Table IV are believed to be lower than would have been obtained if the specimen had been polished longitudinally instead of circumferentially. This statement is based on the scatter obtained in making these fatigue tests where a number of specimens failed late in life, at stresses above the endurance limit values given, suggesting surface finish as the reason. Also from a consideration of the photoelastic stress concentration factors for the fillet and notch specimens it would be necessary for the fatigue strength for design A to be greater than shown in Table IV. On this premise the fatigue strength for design A under ideal surface finish conditions would be expected to be about 10 to 15 per cent greater than that given

TABLE I
Chemical Analysis of Steels Investigated.

| Type Steel | Chemical Analysis, Per Cent | | | | | | | |
|------------|-----------------------------|------|-------|-------|------|------|------|------|
| | C | Mn | P | S | Si | Cr | Ni | Mo |
| NE 8744 | 0.43 | 0.84 | 0.016 | 0.025 | 0.24 | 0.51 | 0.54 | 0.24 |
| NE 8949 | 0.46 | 1.06 | 0.014 | 0.017 | 0.26 | 0.56 | 0.57 | 0.33 |
| NE 9445 | 0.44 | 1.18 | 0.017 | 0.020 | 0.46 | 0.33 | 0.52 | 0.12 |
| SAE 4340 | 0.44 | 0.80 | 0.014 | 0.018 | 0.26 | 0.75 | 1.75 | 0.25 |

TABLE II
Grain Size of Steels Investigated.

| Type Steel | McQuaid-Ehn Grain Size | | Oxidation Grain Size 1550 deg. F. |
|------------|------------------------|------------|--------------------------------------|
| | Hot Rolled | Normalized | |
| NE 8744 | 7/8 (5) | 7/8 | 8 |
| NE 8949 | 6/8 (5) | 7/8 | 8 |
| NE 9445 | 8 | 8 | 7/8 |
| SAE 4340 | 8 | 8 | 8 |

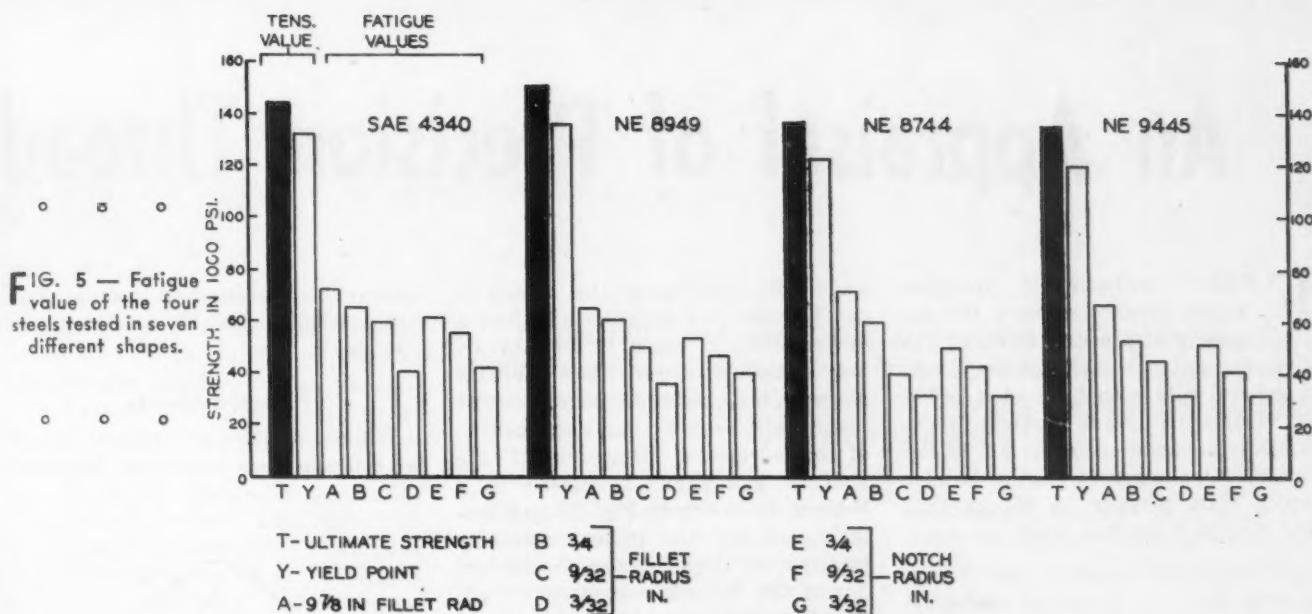


FIG. 5 — Fatigue value of the four steels tested in seven different shapes.

for SAE 4340 and NE 8949. Also NE 8744 may be increased by as much as 5 per cent and NE 9445 by less than 5 per cent.

Truncated Whitworth Thread Form

SO that Whitworth screw threads may be produced more easily by American manufacturers while maintaining complete interchangeability with threads of British Standard Whitworth form, the American Standards Association has approved a new war standard, Screw Threads of Truncated Whitworth Form, B1.6-1944. Requested by the War Production Board last year, this standard gives complete specifications including gaging instructions, for American truncated Whitworth threads which (1) are interchangeable with British Standard Whitworth threads; (2) can be produced with tools having flat crests and roots and (3) can be checked with threaded plug and ring gages having flat crests. The new American war standard covers coarse and fine threads, straight pipe threads and special threads.

The original system of truncated Whitworth thread that served as a basis for the standard was devised in 1941 by Archibald E. Smith, senior ordnance engineer, Army Ordnance Department.

"The American War Standard, Screw Threads of Truncated Whitworth Form" (B1.6-1944) may be obtained for 50c. per copy from the American Standard Association, 70 East 45th Street, New York 17.

FIG. 6—Photoelastic study showing stress concentration near base of fillet radius.



TABLE III
Physical Properties.

| | Yield Point, Lb. Per Sq. In. | Ultimate Strength, Lb. Per Sq. In. | Elongation, Per Cent | Reduction in Area, Per Cent | Izod, Ft.-Lbs. |
|---------------|------------------------------|------------------------------------|----------------------|-----------------------------|----------------|
| SAE 4340..... | 132,000 | 144,900 | 17 | 58 | 57-58-58 |
| NE 8949..... | 136,300 | 149,500 | 19 | 61 | 56-57-58 |
| NE 8744..... | 121,500 | 136,400 | 17 | 58 | 26-23-26 |
| NE 9445..... | 119,000 | 134,300 | 18 | 57 | 53-52-52 |

TABLE IV
Fatigue Strength Values of Four Steels with Different Shapes, Based on 30 Million Revolutions. Shape of Specimens Shown in Fig. 1.

| Shape Specimen | | Fatigue Strength, Lb. Per Sq. In. | | | |
|----------------|--------|-----------------------------------|---------|---------|---------|
| R, In. | Design | SAE 4340 | NE 8949 | NE 8744 | NE 9445 |
| 9/16 | A | 72,000 | 65,000 | 72,000 | 67,500 |
| 3/4 | B | 65,000 | 61,000 | 60,000 | 53,000 |
| 9/32 | C | 59,000 | 50,000 | 40,000 | 45,000 |
| 3/32 | D | 40,000 | 36,000 | 32,000 | 32,000 |
| | E | 61,000 | 54,000 | 50,000 | 51,000 |
| | F | 55,000 | 47,000 | 43,000 | 41,000 |
| | G | 42,000 | 40,000 | 32,000 | 32,000 |

An Appraisal of Precision Thread

EVERY producer of precision rolled threads stresses the necessity of precise control of the diameter and circularity of the blank. A general rule is that for each 0.0005 in. variation in blank diameter there is 0.001 in. variation in the p.d. of the thread. One aircraft engine builder which rolls threads on blanks that are turned from bar stock on auto-

anvil. By examining the sketch it can be seen that regardless of how a measurement is taken, if the measuring device comprises two parallel planes, the distance between the planes will be $R+r$ for any position of measurement. However, if the stud or bolt shank is placed in a V-block as shown in Fig. 22 and centerline of the dial indicator spindle is displaced slightly from the centerline of the V-block, concentric out-of-roundness will show up as a variation in the indicator needle, although the reading will be relative rather than an absolute value. This off-center distance need be only 1/64 to 1/32 in. for a 1/2 in. stud.

In another aircraft products plant where studs are produced from centerless ground bar stock, incoming steel is magnetically inspected for seams and pipes and any questionable rods are magnafluxed. In fact, the latter practice is quite general. Bars are spot checked for hardness and heats are identified by lot numbers. Chemical analysis is run from random samples. After the stud blanks leave the centerless grinders, they are checked 100 per cent for diameter. Rolled threads are also checked 100 per cent.

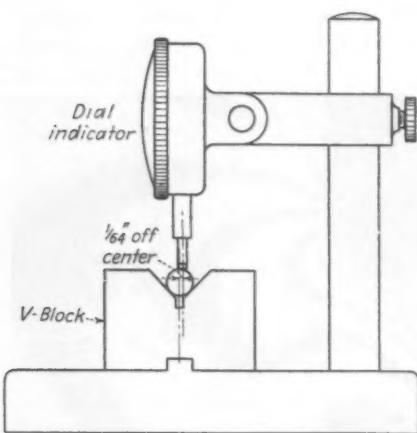


FIG. 22—Dial indicator and U-block setup for detecting minute "concentric" out-of-roundness of centerless ground studs or bolt shanks.

matic screw machines, after heat treating, centerless grinds the shanks of studs and bolts in two steps. On the rough grind the o.d. is held to a total tolerance of 0.002 in.; on the finish grind, the o. d. of the shanks are held to a tolerance of 0.0003 in. which is less than one third the pitch diameter tolerance on the rolled thread. (This applies to all sizes.) Before rolling, the stud shanks are checked 100 per cent for diameter on Sheffield visual gages reading to "tenths."

In this same plant circularity is held within 0.0003 in. On centerless ground work, out-of-roundness can best be checked by the setup shown in Fig. 22. Centerless ground parts are sometimes not truly circular as a periodic condition occasionally arises that causes them to be ground with three, five or seven lobes shown in highly exaggerated form in Fig. 23. This concentric out-of-roundness cannot be detected by micrometer calipers or a conventional dial indicator and flat

optical and mechanical comparators are generally available for more precise check.

Extruded Shanks

While centerless grinding of blanks is common practice for precision

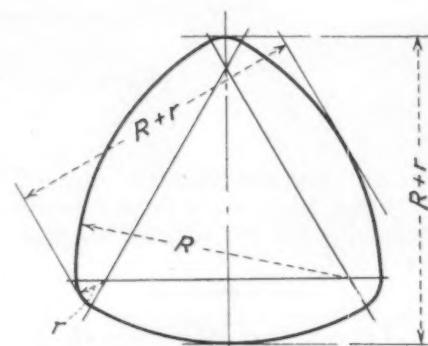
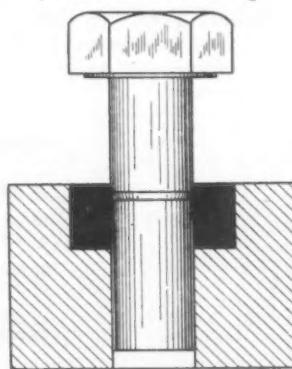


FIG. 23—Exaggerated form of concentric out-of-roundness sometimes encountered in centerless ground stock. When measured between two parallel planes, as with a micrometer, the stock will appear truly round in any position.

rolled threads, it is far more common to make such products from cold headed components.¹ Here, more often

¹ For a complete discussion of this subject see "An Appraisal of Cold Heading Practice" by the same author, THE IRON AGE, June 9 and 23, July 7, 1938.

FIG. 24—Typical carbide nib through which the shank of a bolt is extruded prior to thread rolling.



than otherwise, it is the practice to extrude the shank through a carbide die ring, Fig. 24 either in the second stroke of the machine when the coned head is flattened to its final height or in the head trimming operation, Fig. 25. By this is meant that the shank, which up until this point has the same commercial tolerance on diameter as the wire coil stock being fed into the header, is pushed through a draw ring of smaller diameter, thus lengthening (hence extruding) it and reducing its diameter. Fine finish on the carbide die, together with its relatively long wear life, assures the extruded shank being closely held as to diameter over a long period of time.

Although extruded shanks can meet the size tolerances imposed by pitch diameter tolerances on Class 3 and 4

Rolling Practice . . .

By FRANK J. OLIVER

threads, several aircraft bolt manufacturers take the further precaution of centerless grinding the bolt shanks. One manufacturer even goes as far as to state that grinding of the blank prevents flaking at the top of the threads if the surface roughness is properly controlled. Like any cold drawn product, extruded shanks have a high finish (low value of surface roughness). Below a surface roughness of 30 microinch RMS, slippage is likely to take place between flat roll thread dies, causing mismatch and double threads. One authority recommends grinding blanks to a surface roughness ranging between 30 and 50 microinch. Above 50 microinch, flaking of the crests is likely to take place, this man states.

With cylindrical die machines, the highest surface finish can be employed on the work. Since cylindrical die machines have their dies geared together and hence synchronized, slipping must be equal and in the same direction on both or all three dies. The work may screw its way out from between the dies if slipping is great enough, but it can never get out of match.

At the opposite extreme, a large automotive producer sizes its blanks by passing the centerless ground studs through a Manville thread roller tool with a pair of smooth surface dies. There is some doubt whether sizing actually takes place when a cylindrical piece is rolled between two flat, polished surfaces. Some maintain that the circular cross-section momentarily is distorted into an ellipse and immediately springs back into a circular section of the same diameter, the point being made that dimensional change can only take place by extrusion. The action is described more as a planishing one—a smoothing of the high spots left by the grinding wheel.

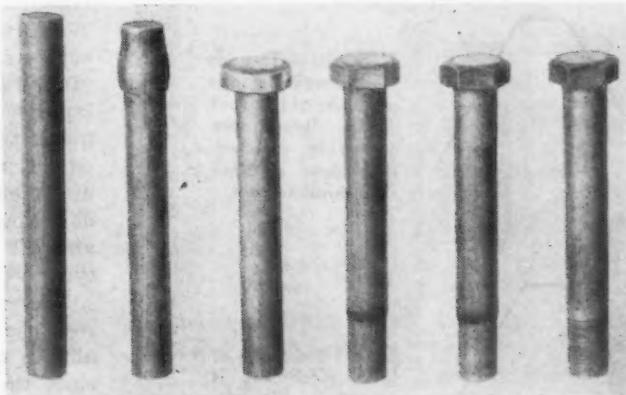
In another plant producing millions of small threaded products, the blank tolerances are closely held by constant checking of the heading dies in which a sizing operation is in-

cluded. Most screws made here are threaded right up under the head. In the cold headers, the stock is upset or increased in diameter 0.0005 in. rather than being extruded to a smaller size. Solid dies are used which are carefully reamed in the soft state and lapped after hardening. To increase die life, the dies are preloaded in compression by quenching them internally.²

² See "Getting the Most Out of Cold Heading Dies," by Frank B. Palmer, THE IRON AGE, July 21, 1938.

When lapping the bore, account is taken of which end the quench water entered as the quench will not be so drastic at the far end due to the

FIG. 25—Sequence of operations on a cold headed bolt. From left to right: Cut off wire, cone head, final heading, trim hexagon and extrude shank, chamfer end, roll thread.



warming of the water in transit. Watching fine points like this enables the dies to be lapped within 0.0005 in. of nominal size.

Even though the dies have been carefully lapped, however, the first 250 pieces off the header will probably have undersize shanks. Despite preloading, lapping and other precautions, the die bore will open up several "tenths" within the first few minutes of running. This phenomena

is taken into account in lapping and the initial run of blanks is discarded.

Reaming of header dies after they have been hardened is a practice that the majority of bolt and nut shops have been using for years, but as the process may not be generally known, it will be described briefly. Dies with a hardness up to 60 R_c can be reamed fairly economically, that is, one tool will finish perhaps 30 to 40 dies. Above this hardness, tool life becomes low and a hardness of 62 R_c is the practical limit from any angle.

Reaming is done with special glass hard reamers, usually made from drill rod that is hardened but not drawn. Both single and multiple groove reamers are used. The real trick in this operation is in getting exactly the right amount of front rake, top rake and land. It is advisable to run the reamer very slowly and to use a lubricant containing turpentine. Accuracy in finish comparable to internal grinding can be secured by operators skillful in this art.

As the header dies begin to near the end of their normal run, the floor inspectors watch for oversize blanks and for blanks with tapered shanks due to bell mouth wear. Tapered shanks are one of the chief causes of die chipping near the edge.

Comparative Tolerances

Pitch diameter tolerances for Class 2 screws of small size are within the same range as the tolerances in Class 3 screws of larger size and the problems of rolling instrument screws are therefore the same as rolling engine studs, since small screws are often produced from high tensile wire. The following table of com-

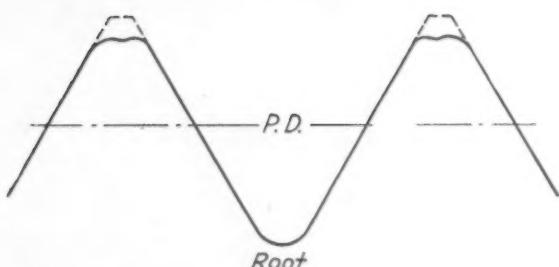


FIG. 26—Rolled thread with partially filled crest. (7/16-20th at 40x for all seven views.)

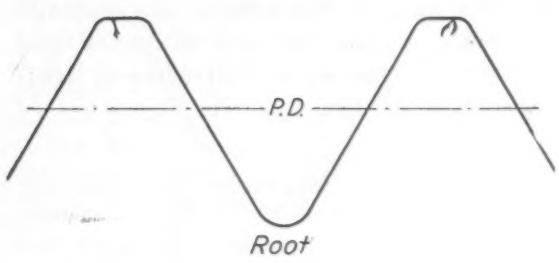


FIG. 27—Seam in crest of rolled thread.

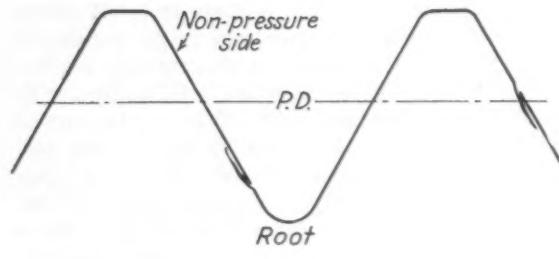


FIG. 28—Slivers or laps below the pitch line on the non-pressure side of the thread are acceptable in all except Class A aircraft threads.

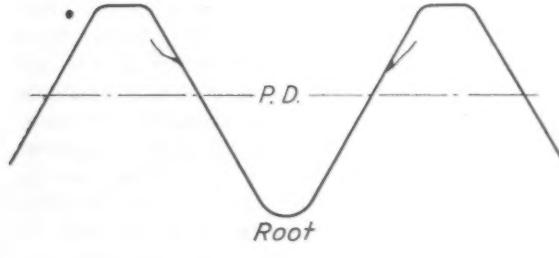


FIG. 29—Laps above the pitch line are not always a cause for rejection.

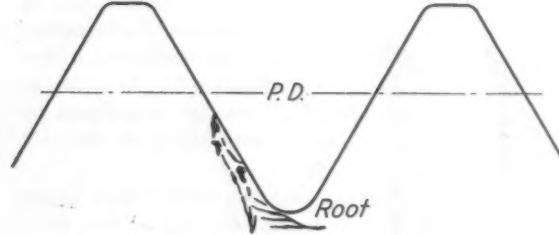


FIG. 30—Threads with multiple laps or seams at the root of the thread are invariably rejected. The cause is often die misalignment.

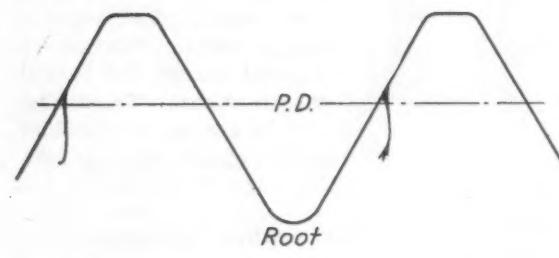


FIG. 31—Failure at the pitch line is caused by die misalignment.

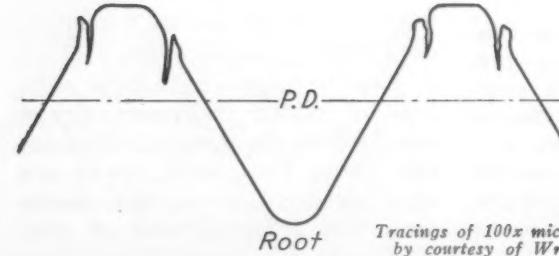


FIG. 32—When severe laps appear in the crests, defective dies are indicated.

Tracings of 100x micrographs (reduced to 40x) by courtesy of Wright Aeronautical Corp.

parison applies to National fine thread series:

Precision Thread Rolling—Part III

| Mach. Screw No. or Nom. Size | Pitch Diameter Tolerance, In. |
|------------------------------|-------------------------------|
| 3 | 0.0020 |
| 10 | 0.0027 |
| 1/4 in. | 0.0031 |
| 7/16 in. | 0.0026 |
| 1/2 in. | 0.0026 |

Class 2

Class 3

For threads within the range of No. 3 to 1/4-28, the tolerance on the blank diameter is set as follows:

Min. blank diam. = Min. p.d. on thread + 0.0001 in.

Max blank diam. = Min. p.d. + 75 per cent of tolerance range for Class 2 screw.

Less than 5 per cent of screws rolled on stock held this closely will be found to exceed Class 2 fit tolerances. Out-of-roundness is no problem on this small work.

Thread Failures Analyzed

If dies are not properly set up in the machine or are inaccurate, rolled threads will be found to develop slivers, laps and seams which may not be visible to the naked eye except in extreme cases but which show up very readily in the microscope or by Magnaflux inspection. Many threads will be found to have unfilled crests but these are not always objectionable, in fact sometimes desirable, inasmuch as the metal tends to give a rounded contour as can be seen in Fig. 26. Craters or seams in the crest, such as are shown in Fig. 27, are often due to slow rolling. When these laps are seen on the non-pressure side inside the pitch diameter, Fig. 28, or on the pressure side outside the pitch diameter, Fig. 29, they are not always objectionable and are often passed in aircraft studs except the Grade A type.

The multiple laps and seams at the root shown in Fig. 30 are objectionable in all types of precision threads since they lead to early fatigue failure. The cause is generally die misalignment or the fact that the thread is produced in too few turns of the blank. The type of failure at the pitch line, shown in Fig. 31, is also a common result of die misalignment. When viewed endwise and detected by Magnaflux methods, the crack will be found to extend over an arc of 45 to 90 deg. This type of failure is objectionable when it occurs on all threads of the bolt or stud. Severe laps in the crest of the thread as depicted in Fig. 32 obviously reflect poor practice and poorly made dies.

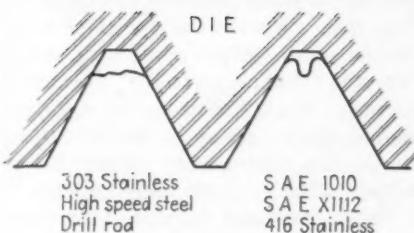


FIG. 33—The materials shown at the left give some of the best results in rolling for the reason that they have less tendency to leave a seam in the crest such as the steels at the right do.

Usually the only remedy is to throw away the dies and start with another set.

In the aircraft industry Grade A threads shall have no laps or seams of the kind depicted and they shall be true to form except that the first and last threads of the bolt screws and the nut end of the stud may deviate slightly from the true form. On the nut end of straight or stepped studs the first three threads and the last thread may deviate slightly from the true form as depicted in Fig. 24.

Grade B threads shall have no multiple laps or seams at the roots or sides of the thread and no single lap in all threads inside the pitch diameter of the thread. (See Figs. 30, 31 and 32.) Slight laps or seams are permissible in the crests at the sides opposite the p.d. and at the non-pressure side inside the p.d. of all threads. Slight deviations from true form are permissible on the first and last threads and on the crest of all threads of bolts, screws and the nut end of studs. On the stud end of straight or stepped studs slight deviation from true form is permissible on the lead thread and the last thread and on the crest only of all threads. So-called commercial aircraft threads may have many of the defects shown if they are not excessive. AN standards allow two defective threads at the end of a bolt, although in highly stressed members, the presence of good threads here often means the difference between stripping the bolt or not.

Standard 18-8 stainless steel, high speed steel and drill rod have less tendency to leave a seam in the crest of the thread than many other steels (See Fig. 33) although these materials are "hard" on the dies. The reason is that the center of the thread comes up at least as fast as the edges, whereas in straight chrome stainless and even in screw stock the material on the flanks of the thread tends to run up the die sides faster than the middle of the crest rises.

As an example of what accuracy means in terms of die life and hence

tool costs, it may be said that for Class 3 fits, dies suitable for Grade A threads have a life of 7000 pieces, for Grade B thread, a life of 15,000 pieces and for Grade C thread a life of 20,000 pieces in heat treated steel of 32 R_c hardness. This compares with 200,000 pieces obtained from



FIG. 34—Recommended beveling of screw blanks to reduce chipping of dies through center.

• • •

double faced dies (4 turns) working on annealed stock of 24 R_c hardness.

Dies for Class 1 and 2 fit threads are left sharp at the roots and crests of the grooves. Because of insufficient confinement of the metal, use of a sharp V allows too much "weep" for precision work, resulting in a threaded product with a hollow crest like that shown in Fig. 26, but in more exaggerated form. Hence all straight dies used for Class 3 and 4

root diameter goes to the bottom.

There are several other problems peculiar to thread rolling practice. One is in producing a starting thread at the end of the bolt without undue wear on the dies. Chipping throughout the center of the die at the end of the blank is not uncommon. This type of die failure is definitely traced to the shape of the end of the blanks. Blanks with large 45 deg. bevels have been the worst offenders. By using blanks with a relatively long, 60 deg. included angle bevel (see Fig. 34) chipping is immediately reduced but this design is not always feasible in aircraft bolts where length is a factor.

Blending Threads into Shank

Another problem is blending the thread at the upper end into the shank, particularly in the case of long aircraft hinge bolts or engine bolts that have ground bodies. At one plant where rolled threads are produced with an appearance resembling cut threads, this problem is taken care of by using a 15 deg. blending angle between the extruded shank on which the thread is rolled and the upper body of the bolt. Referring to Fig. 35, by close control of dimension

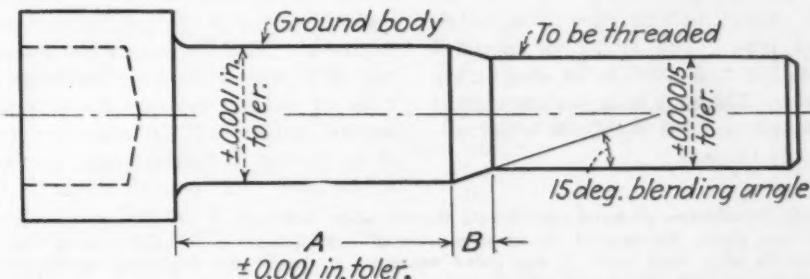
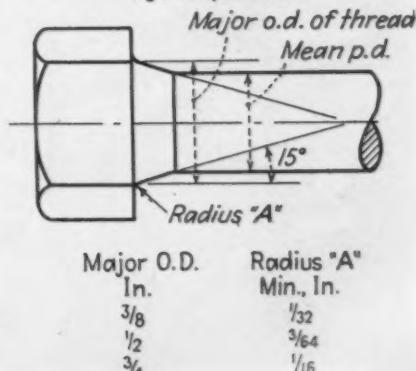


FIG. 35—By close control of dimension A and slope of B, it is possible by relieving edge of flat dies to so roll thread that crest blends exactly into shank of cap-screw, making it difficult to distinguish between rolled thread and cut thread if machine is adjusted properly.

• • •

threads have flat crests, with the edges stoned off and flat fillets. Circular dies are made of similar thread form. On work produced on circular die machines, however, it is often found that the crest is not fully filled out, in other words, that it has a hollow spot at the top. It is likely that the corresponding root diameter is too large although the pitch diameter of the thread may check in tolerance range which is usually about 0.001 in. for Class 3 threads. If the root diameter is brought down to size, more metal may be pushed up into the crests. It is for this reason that some rolled threads have to be centerless ground on the o.d. if the

FIG. 36—The 15 deg. blending angle illustrated in Fig. 35 may also be used to blend threads into the radius under the head of the bolt where such a design is specified.



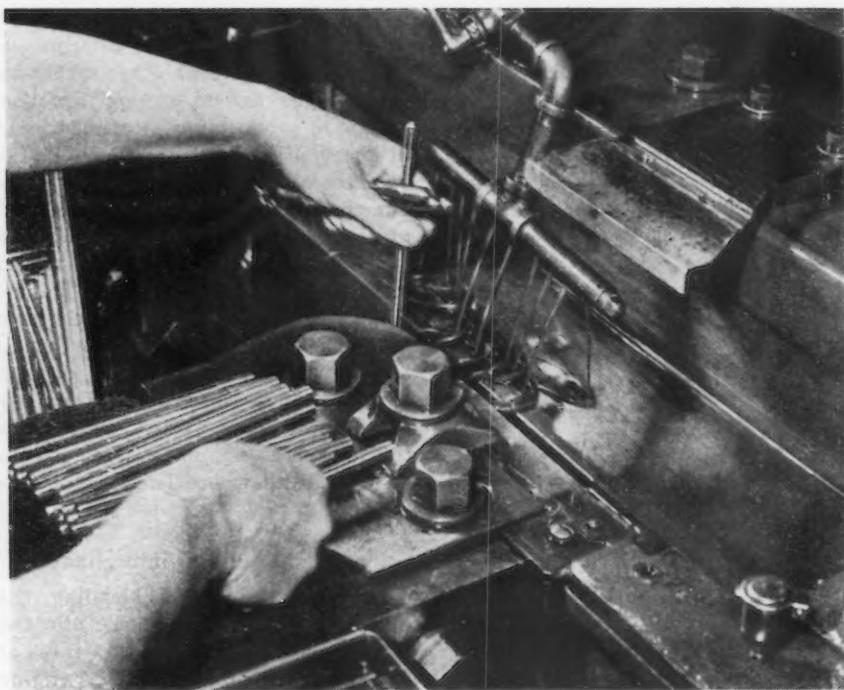


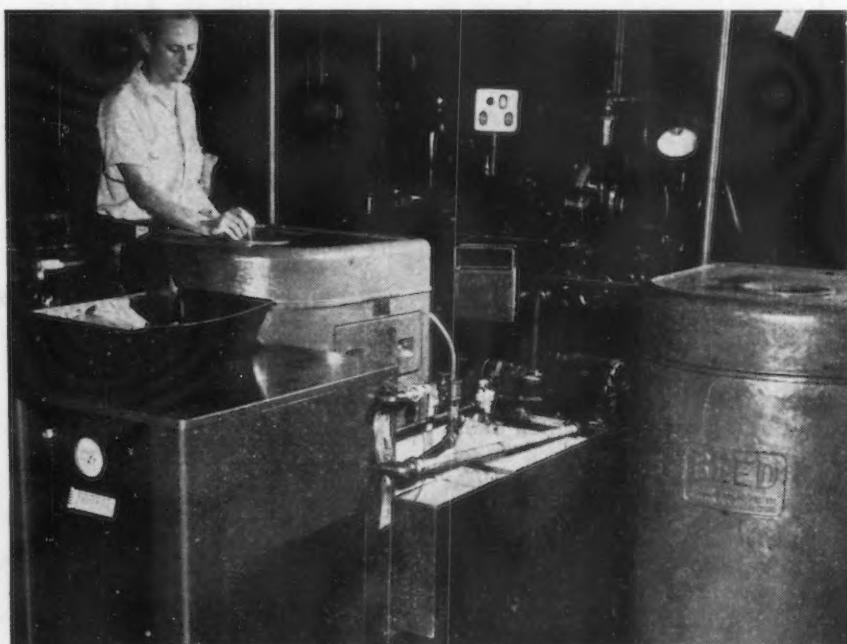
Photo courtesy Chevrolet Motor Div. of General Motors

FIG. 37—A generous amount of coolant distributed over the entire face of the die is called for in rolling threads in heat treated materials. Long studs must be picked off by hand.

A, namely, the length of the body to within 0.002 in. and the slope of the blending angle in section B, it is possible by relieving the edge of flat dies to so roll the thread that the thread blends exactly into the shank of the bolt, which in this case is a hollow head type. The shank is extruded to within ± 0.00015 in. of size before rolling. The body is centerless ground to within ± 0.001 in. of size after rolling the threads.

Rolling a thread close to the shoulder of a bolt head presents a similar problem and is likely to lead to the type of die failure shown in Fig. 21 (refer back to Part II). Fortunately, in high strength bolts, use of a radius under the head of the bolt is necessary to prevent fracture due to the tension set up in the bolt. Fig. 36 shows a type of design favored by aircraft engine builders. Note again the use of a 15 deg. blending angle to ease

FIG. 38—Battery of Reed circular die thread rollers installed at Wright Aeronautical Corp. plant. Because of the large amount of heat generated in cold working high strength alloy steel bolts, it was found necessary to install the Frostrode refrigerant unit shown at the left foreground to prevent the coolant (and lubricant) from getting hot. A cartridge type filter is incorporated within the Reed unit.



the last threads into the radius. Dies for this class of work should be beveled at the edges to provide relief for the radius and the first two threads on the bottom of the die should have the edges stoned off to round the stud thread fillets, get a better "start" and prolong die life.

There are some designs of aircraft engine bolts that use an undercut body at the ends of the thread. This design also places heavy loads on the edges of the dies which tend to break out because of the unbalanced material being cold deformed.

Lubricants and Coolants

While many low tensile bolts and screws are rolled dry or with soluble oil, for precision work oil is almost invariably employed as a coolant, particularly on high strength materials. Of the plants investigated, only one was found to be rolling aircraft bolts and studs to Class 3 fit dry. Paraffin oil mixed with a sulphur base animal oil is quite popular on Waterbury Farrel and Manville units. At one aircraft plant the mixture is 1 part of high sulphur base (15 per cent) to 24 parts of 28 deg. paraffin oil. Mineral seal oil and lard oil are also employed as are some hydraulic oils normally applied in machine tool circuits. Although some recommend only a thin film of lubricant—just enough to wet the surface—flooding of the dies, Fig. 37, is far more common.

On the Watson-Flagg circular die machine, a sulphochlorinated cutting oil (Thred-Kut) has been found to work out best.

On the Reed cylindrical die machine despite the fact that the coolant must also act as a lubricant for the toggle mechanism, sulphur base oils have been recommended when hard stock is to be rolled, although a mineral oil is ordinarily employed.

Since temperatures in the range of 250 to 300 deg. F. will deteriorate the dies, when rolling hard materials it is necessary either to slow down the machine or cool the oil. Fig. 38 shows an application of a commercial refrigerator to a Reed machine. An auxiliary motor driven gear pump is used to circulate the oil through the Frostrode unit and the cartridge type filter incorporated in the thread roller.

In the National Welding Machines hydraulic unit the oil is water cooled. A good grade of hydraulic oil is recommended and it is passed through a magnetic filter before being cooled. This oil lubricates all moving parts and floods the dies as well.

Operating temperatures of the machine and hence oil viscosity and thickness of lubricating film of the

slides of a straight die machine have an influence on the accuracy of the work produced. When a machine is started up cold, it will generate a different size screw thread than when at normal operating temperature. Even where cooling is employed, it is recommended that the oil be warmed by running the machine idle $\frac{1}{2}$ hr. before rolling threads.

Whatever oil is used should be clean. Filters are valuable for this purpose, particularly on precision work. According to a company pioneering in aircraft screws, filtration provides the following advantages: (1) Better flushing of the dies, eliminating chips between dies and work and resulting in better finishes; (2) longer die life due to reduced abrasion; (3) reduced machine maintenance because of clean oil on ways; (4) cleaner work, and (5) better working conditions for the operator. Magnetic filters remove metallic particles too fine to settle in a sump. Some filter installations are quite elaborate (see Fig. 39). A much simpler, cartridge type filter especially devised for thread rollers is shown in Fig. 40. It has two spirally wound bags branching from a central pipe. By removing the bags every three weeks and cleaning in gasoline, one plant changed no coolant oil on a Waterbury Farrel machine in four months. This saving in oil was more than enough to pay for the filter.

Rolled precision threads should be protected from damaging each other as they drop from the end of straight die machines. Long studs and bolts are literally picked off by hand. (See Fig. 37.) In one plant, as short studs drop out of the dies, they fall into an oil bath on the surface of which are floated three or four $\frac{1}{4}$ in. slats of wood. These break the fall and prevent the metal from striking hard against studs previously dropped into the container.

Acknowledgments

The following companies courteously contributed data on their practice in rolling precision threads, on the basis of which this article was written:

Producers of Rolled Threads

Chevrolet Division of General Motors Corp., Bay City, Mich.
Ford Motor Co., Dearborn, Mich.
Holo-Krome Screw Co., Hartford.
Lamson & Sessions Co., Cleveland.
Nash-Kelvinator Co., Kenosha, Wis.
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.
R. & M. Engineering & Mfg. Co., Passaic, N. J.
Rockford Screw Products Co., Rockford, Ill.
Western Electric Co., Hawthorne, Chicago.

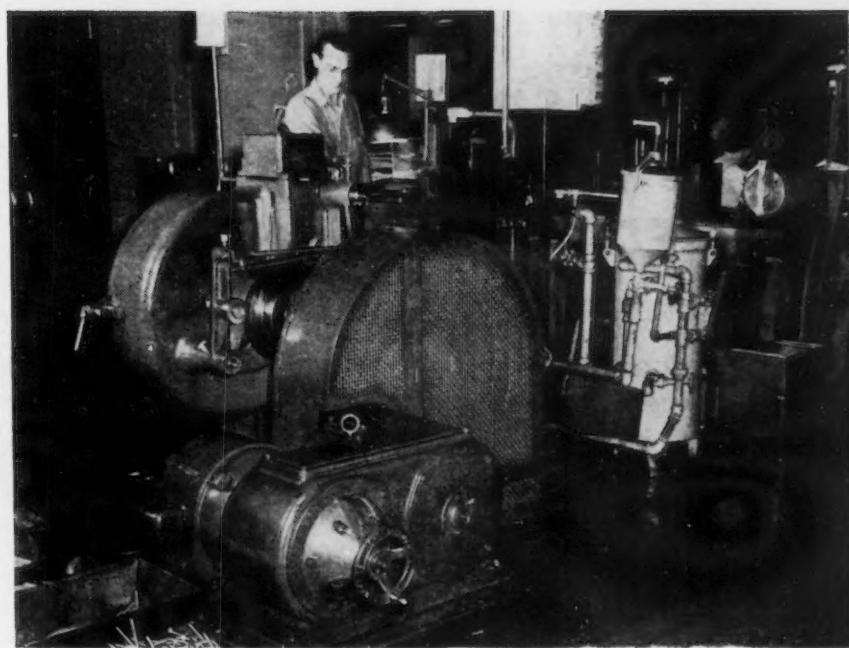


Photo courtesy Wright Aeronautical Corp.

FIG. 39—Waterbury-Farrel thread roller equipped with a Reeves variable speed drive and (in the background) a U. S. Hoffman Filpro M-400 pressure filter unit employing diatomaceous earth deposited on a series of circular screens.

Wright Aeronautical Corp., Paterson, N. J.

Thread Roller Builders

National Electric Welding Machines Co., Bay City, Mich.

Rolled Thread Die Co., Worcester, Mass.

William A. Schuyler Co., New York City.

Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

Watson-Flagg Machine Co., Paterson, N. J.

Roll Thread Die Makers

Cleveland Die & Mfg. Co., Cleveland.

Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.

Rolled Thread Die Co., Worcester, Mass.

Tool Steel Suppliers

Allegheny Ludlum Steel Corp.

Bethlehem Steel Co.

Carpenter Steel Co.

Crucible Steel Co. of America.

Latrobe Electric Steel Co.

Midvale Co.

Universal-Cyclops Steel Corp.

Vanadium-Alloys Steel Co.

Vulcan Crucible Steel Co.

Miscellaneous

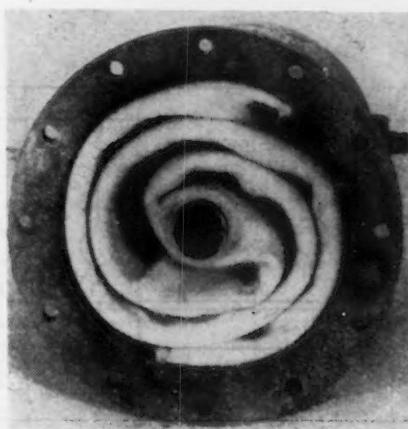
Federal Products Co., Providence.

Greenfield Tap & Die Co., Greenfield, Mass.

Morse Twist Drill Co., New Bedford, Mass.

U. S. Hoffman Machinery Corp., Syracuse.

FIG. 40—Low cost cartridge type filter especially adapted for straining dirt and fine metallic particles out of thread roller collants. It is offered by the U. S. Hoffman Machinery Corp.



Continuous Electro-Zinc Plating

... A brief discussion of some of the problems encountered in adapting various electro-tinning units for continuous steel strip to electrolytic zinc plating of the strip. The success has been such as to promise the use of the same units for electro-deposition of other metals.

SINCE the advent of the electrolytic tinning line for the continuous electro-deposition of tin onto steel strip, much thought and research has been given to the practicability of electroplating other metals in a similar manner. As a result, zinc is now being deposited on continuous strip up to 38 in. in width at a speed of 160 ft. per min. and in coating weights ranging to 0.1 to 0.2 oz. of zinc per sq. ft. of strip.

This process can be successfully carried out on any of the various

By J. RAYMOND ERBE
Steel Mill Engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh

ranges are provided in the control, plating current supply, solution handling equipment, etc. The various types of tinning lines have been described in great detail in previous articles by several authors* so this dis-

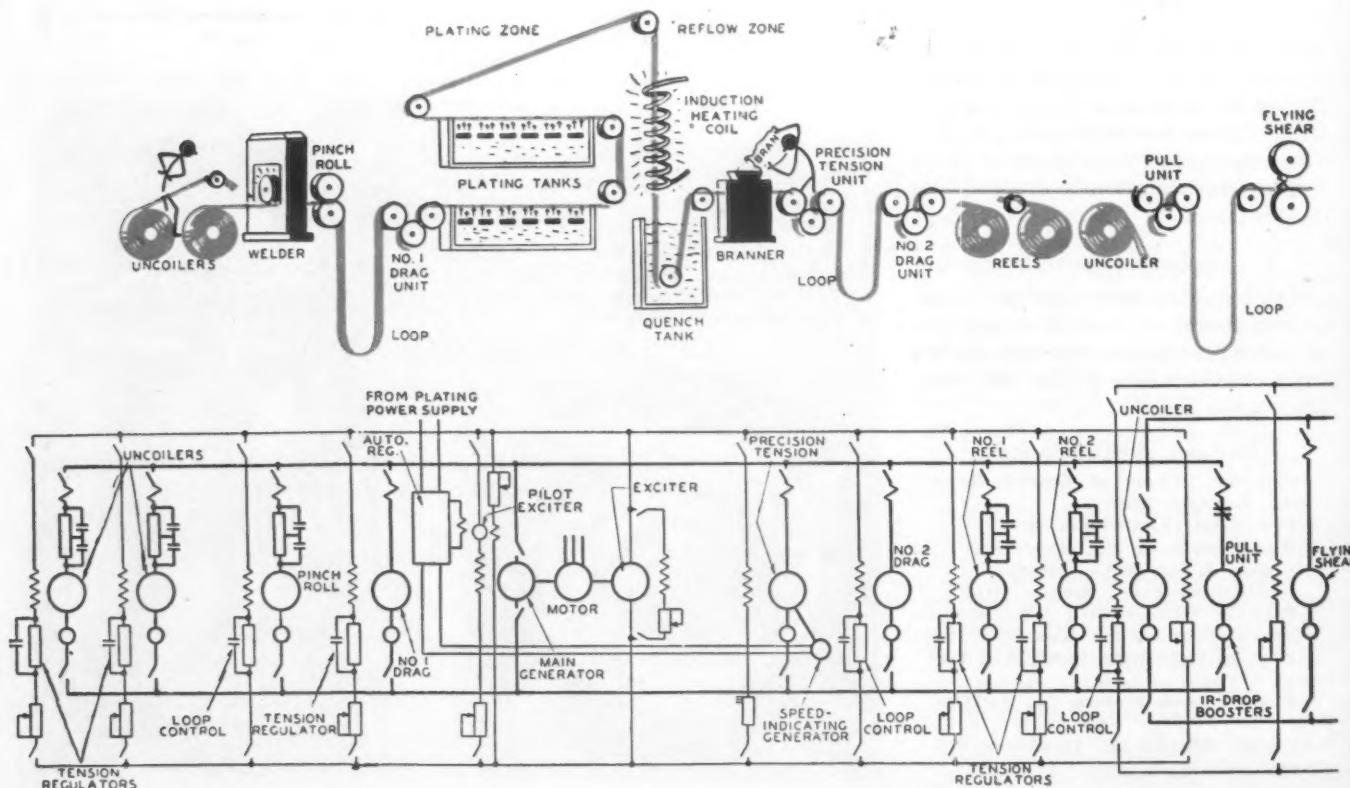
*See THE IRON AGE, April 30, 1942.

cussion will be confined to the high speed, horizontal plating tank type of

line. A schematic arrangement of a line of this type is shown in Fig. 1.

This line essentially consists of three distinct parts: An entry section where the strip is uncoiled, a plating zone, and a delivery section where the strip is reeled up. A fourth part, as shown, can be added, if it is desired, in which the continuous strip is cut up into sheets instead of being rewound into coils. As the line shown in this figure was designed for electrolytic tinplating at a maximum speed of 1300 ft. per min., a reflow zone was required to provide a more corrosion resistant product. This reflow zone is not required for zinc plating, hence, the strip is either passed through the inductor coils in the normal manner and they are left deenergized or the strip is carried around the inductor coils.

The entry end of this line essentially consists of the uncoilers, welder, and pinch roll. Two uncoilers are used to provide continuous



operation by welding the front end of each succeeding coil to the rear end of the previous coil. These uncoilers normally operate as drag generators to eliminate any tendency which they might have to overrun the line speed and further complicate the operating problems. The pinch rolls, therefore, serve to pull the strip off of the uncoilers and feed it into the entry loop.

This entry loop has two fundamental functions: first, it provides storage of strip to permit the remainder of the line to operate during the time that the entry section is stopped while a weld is being made; and second, it simplifies the problem of guiding the strip through the line since the strip is recentered in the line as it leaves the loop.

Tension between the uncoiler and the pinch roll is automatically maintained by means of a suitable regulator. This tension is adjustable, over a wide range, by the operator to meet the varying requirements caused by different gages of material, line speed, temper of the material, etc. Stall tension is also provided to prevent any unnecessary whipping of the strip when starting the line, which results if any slack exists between the uncoiler and the pinch roll, and to minimize the tendency to break the strip because of too much whipping.

The entry loop is automatically maintained by varying the speed of



FIG. 2—Main control room for a 1000 ft. per min. electrolytic tinning and a 600 ft. per min. shearing line. These control panels extend for nearly 200 ft. down each side of the room. Regulating and adjusting resistors are mounted in the upper rear section which permits installing auxiliary motor-generator sets directly beneath. One of the 14 auxiliary motor-generator sets can be seen in the left foreground.

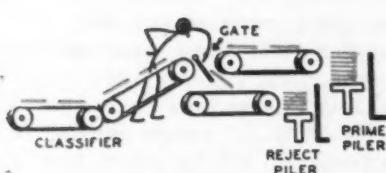
the pinch roll. Photoelectric control is used to make the necessary speed changes required. The speed of the uncoilers follows automatically through the normal action of the tension regulators in maintaining a constant pull on the strip.

The length of strip in the entry loop and the time required to make the weld determine the "threading" speed of the line which is the speed at which the plating and delivery sections can be run while the entry end is stopped.

Since a line of this type normally runs at speeds ranging from the threading speed to the maximum running speed, the problem of how to

maintain a uniform coating during these speed changes presented itself. A suitable regulating system was developed for these lines which varies the plating current proportionally with the line speed. It was recognized at the time that these lines were being designed that it might be desirable to deposit coatings of different thickness on each side of the strip or possibly of dissimilar metals. Consequently, a separate regulating system is provided for each section of the plating zone thus permitting control of the thickness on each side of the strip. As each section of the plater is composed of several individual cells, being able to control each section independently permits the removal of any of these cells without impairing the overall operation of the line. When a cell is removed from the line for any reason, the regulator automatically raises the current density on the remaining cells in that section so that the thickness of the coating remains unchanged.

The precision tension unit which is located at the delivery end of the plating zone serves as the master drive of the entire line. The speeds of all of the other drives are regulated to correspond with that set by the precision tension unit. To sim-



LOOP CONTROL FOR TANDEM OPERATION

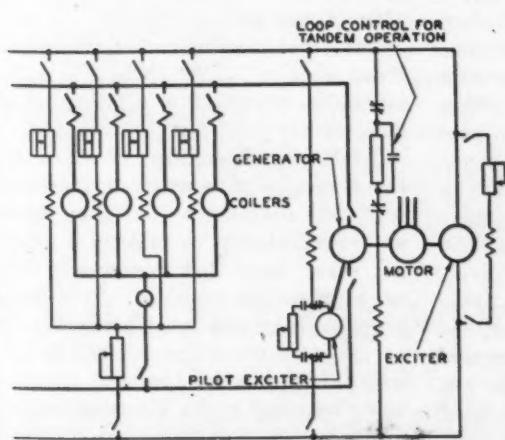


FIG. 1—Schematic arrangement of a plating line with horizontal plating tanks.

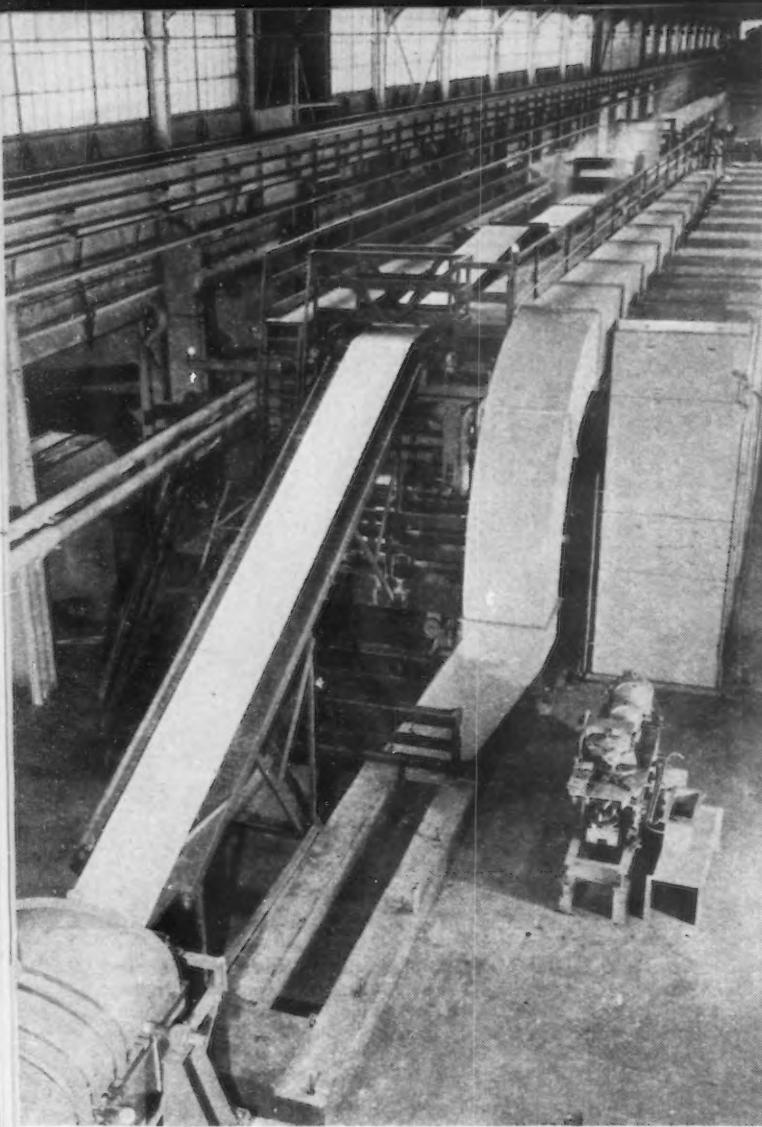


FIG. 3—Electrolytic tin plate emerging from the after plating rinse at 1000 ft. per min. The 5000 amp., 6 volt, Rectox units that supply D.C. current for the electrolytic tin plating process are to the right of the exhaust system duct.

formed by the machines and by the control, particularly with regard to the automatic controls, so as not to impose too much work on either one.

Fig. 2 is a photograph of a control room for two lines of this type. Each of the control panels extend for nearly 200 ft. down the room. As this control was of the factory assembled type, the regulating and adjusting resistors are mounted in the upper rear section on a suitable angle iron framework. This arrangement permitted the various auxiliary motor-generator sets to be placed behind the panels and beneath the resistors, hence, reducing the floor space required for the control room.

Two sources of high current, low voltage, D. C. power for electroplating lines are in common usage at the present time:—motor-generator sets and rectifiers of the copper-oxide type. Both types are being used successfully on these lines. Fig. 3 shows the plating section of one of these lines using 24 of the 5000 amp., 6 volt, Rectox copper-oxide rectifiers for supplying the plating current. Some of the advantages gained by the use of rectifiers for this installation were: a saving of approximately 40 tons of copper per line in the bus structure, elimination of any special foundations as these units were mounted on the floor adjacent to the plating cells, a saving in floor space by mounting the units for the upper section of the plater on top of the units for the lower sections, and reduced maintenance due to the elimination of brushes, commutators, and bearings. The same range of plating control was provided for the lines using rectifiers as was provided for those using motor-generator sets.

Although these lines have approximately 75 D. C. motors ranging in size from 1 to 125 hp. driven from a 400 kw. variable-voltage generator, they operate satisfactorily over a speed range of approximately 50 to 1300 ft. per min.

The total plating power on one of these lines is 720 kw. which is automatically controlled to a minimum of 21.5 kw.

With the flexibility provided by these ranges of control, it is therefore, not surprising that they operate satisfactorily in making a product other than that for which they were originally designed. It is quite probable that still other products will be made on these lines in the future with little or no additional changes being required in the electrical equipment.

plify the regulating problem and reduce the work done by the regulators, all of the drives are operated from the same variable voltage system. Because of this, the speeds of the various drives are approximately synchronized at all times.

Due to a novel combination of mechanical and control features, the strip can be sheared and automatically transferred from one reel to the other without stopping the line. Because of this, the delivery loop, between the plating zone and the delivery zone, serves only for guiding the strip to insure the winding of coils with a uniform edge.

In designing these lines, the engineers of the ultimate customer, the machinery builder, and the electrical manufacturer worked in close cooperation to provide the flexibility that it was felt would be desired. Because this flexibility was provided initially, it is now found that these same lines, that were designed for tin plating at a maximum speed of 1300 feet per minute, can be used for zinc plating without any appreciable change.

Since zinc plating requires a much

greater current density than tin plating, the lines must operate at a greatly reduced speed than that for which they were designed. For coating 38-in. wide strip with from 0.1 to 0.2 oz. of zinc per sq. ft., the maximum line speed is about 160 ft. per min. using the plating current supply provided for tin plating. These lines have been operated continuously for zinc plating at speeds as low as 90 ft. per min. This means, therefore, that the automatic plating control must be able to maintain full plating current at approximately 7 per cent of the maximum line speed.

In designing the electrical equipment for these lines close attention was paid to the many factors which determine whether or not the performance of the lines will be mediocre, average, or exceptional. Only a few of these factors will be mentioned, namely: compensation for the armature voltage drop of the driving motors; regulation of the individual motors and providing compensated motors where it was deemed advisable; proper motor speed ranges by means of field control; and a good balance between the functions per-

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DETROIT—The Chevrolet Motor Division of General Motors, largest producer and seller of vehicles for several years before the war, is quietly preparing itself for any eventuality in postwar business. The planning of the company is tuned to the idea of not only being ready for a stupendous market in the immediate postwar years, but also being able to adjust itself to less abnormal business without undergoing too great deflation.

Accordingly, Chevrolet is figuring on meeting postwar demands by six-day week schedules, on as many shifts as may be necessary. The objective is to be able to produce 400 vehicles per hr.

Three shifts, with lunch periods deducted, would make possible 22½ hr. of productive time daily. At the projected rate, this would result in 9000 completions, or 54,000 weekly. It becomes apparent that in a full year of approximately 300 working days, Chevrolet's potential would run around 2,700,000 cars and trucks. Of course, 300 working days in any one year is unbelievably better than par for the course.

But Chevrolet has a habit of breaking par on occasions, and certainly it can be conceded that the division will leave no stone unturned in its program of maintaining its position at the head of the automotive parade.

Capacity before the war was close to 400 vehicles hourly, but that rate could not be sustained. Bottleneck departments were operating around the clock seven days a week in order

to feed five-day production lines at that top speed. So expansion is planned for several manufacturing departments.

Gray iron castings provide a pertinent example. Before the war Chevrolet's Gray Iron Foundry at Saginaw, Mich., largest in the world, produced slightly above 1500 tons of castings on record-setting days. Inasmuch as each Chevrolet utilized 526 lb. of castings, this volume could supply somewhat less than 6000 vehicles, and outside purchasing was necessary in peak periods.

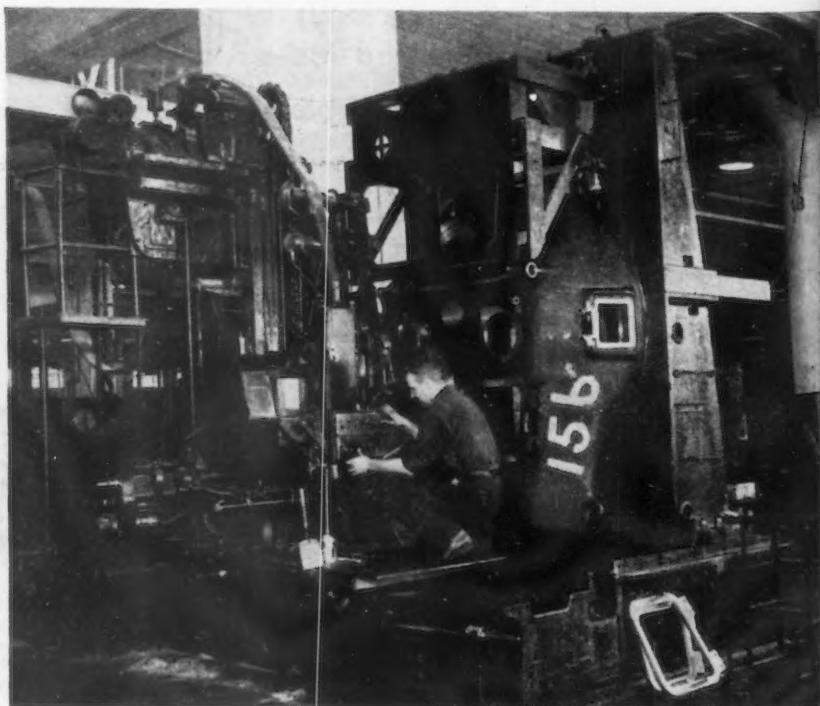
In a postwar era when 9000-unit-per-day volume is required, much greater capacity will be needed. Inasmuch as no other production foundry appears capable of supplying Chevrolet with 800 tons of material daily—the difference between prewar peak and postwar possibility—the Saginaw shops will be most importantly expanded.

Capacity will be raised to approximately 2250 tons daily, by adding six more cupolas and one core room. At the present time there are 12 production cupolas in operation, together

with one small unit for experimental purposes and another for special production. The new unit of six cupolas and the accompanying core room, together with conveyors and other equipment, will be added right at the end of the present row of 12, and will be laid out like the two batteries of six furnaces apiece already installed. The second of these two units, cupolas No. 7 through 12 and their core room, are now being utilized for magnesium castings, but will be reconverted after the war. Enlargement of the Gray Iron Foundry will not mean that Chevrolet will discontinue its casting purchasing from outside sources; this will be continued.

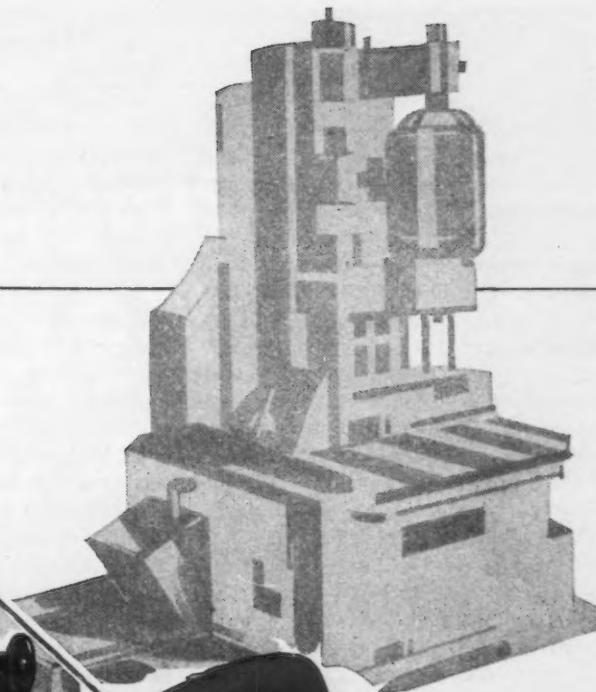
Also scheduled for considerable expansion will be the heat treating facilities throughout the Chevrolet manufacturing plants. In the past these facilities have been barely sufficient to handle volume production by working on a 24-hr. basis, so they will be enlarged somewhat. Slightly more axle, transmission and sheet metal capacity will likewise probably be necessary to maintain production at the projected capacity level.

GIANT PROFILER: Openings on the top of the turret of the Staghound, armored car used to spearhead Allied invasions in France and Italy, are faced by this large profile machine used in production work in a manufacturing plant of the Chevrolet Motor Division of General Motors Corp., sole builders of the Staghound. A special Chevrolet-built fixture holds the heavy turret in place. Operations performed by the machine are guided by a follower tracing a pattern of the top turret openings on the template shown at the upper right.



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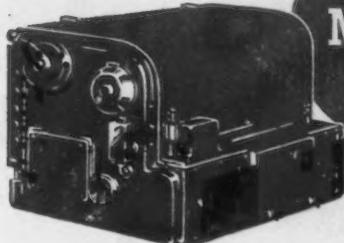
The Bullard "MAN-AU-TROL" principle of automaticity concentrates at a single "nerve center" the entire mental and muscular sequence a man must follow to run a machine... with repetitive accuracy no man can match.

In a Vertical Turret Lathe, for example, this means that it could turn out any part in the required quantity... and then be changed over quickly... *in a few hours, not days*... to produce any other part that manual operation could handle... over the entire range of that machine's possible functions.

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ON THE ASSEMBLY LINE

Expanded machine capacity will also be needed to manufacture spare parts. Spare parts were previously produced on production machines between runs of components destined for the assembly lines; but if the assembly lines require the sustained operation of this equipment, as is expected, additional machinery will be needed to turn out replacement parts.

Working this way, Chevrolet will be readily able to shrink back to normal size when the immediate postwar market has exhausted itself, largely by the simple expedience of reducing hours and shifts.

Precisely how much Chevrolet will spend in its postwar expansion program is not determined. Out of the \$500,000,000 which General Motors has earmarked for reconversion, part goes into manufacturing, part into Fisher operations for the general use of the corporation, and part among the divisions themselves. But it would seem reasonable that Chevrolet, producer of half the passenger cars and 80 per cent of the trucks of the corporation, would receive close to half of the G.M. outlay. Probably \$200,000,000 would be a reasonable figure.

Some of this money is already being spent by Chevrolet. The recent purchase of approximately 700 machine tools from Defense Plant Corp. to General Motors was made for and by Chevrolet. The machines involved were those now being utilized in air-

craft engine manufacture at the Buffalo operation formerly owned and now managed by Chevrolet. This purchase filled a fair amount of Chevrolet's tool requirements, although, of course, there are still many machines to be procured.

As regards facilities, the division is now engaged in negotiation with the government on repurchase of the Delevan Ave. plant in Buffalo, formerly an assembly center, now used for manufacturing operations on aircraft engines. It is probable that these negotiations sooner or later will result in the return to Chevrolet of its former property, giving it a base for operations in Buffalo. This acquisition, however, would not provide facilities to produce engines and axles, formerly made at nearby Tonawanda in a second plant now government-owned. Conceivably, a replacement plant for this one is in the group of 10 which General Motors will build.

As to new models and a possibly lower priced model to meet the new entry promised by Ford (THE IRON AGE, Oct. 26, page 86), Chevrolet is minding its own counsel and saying nothing. In the first place, it would be logical to assume that Chevrolet, like most other manufacturers, will have at least minor changes in its immediate postwar models to distinguish them from the 1942 jobs last in production. Second, it can be said only that top Chevrolet executives

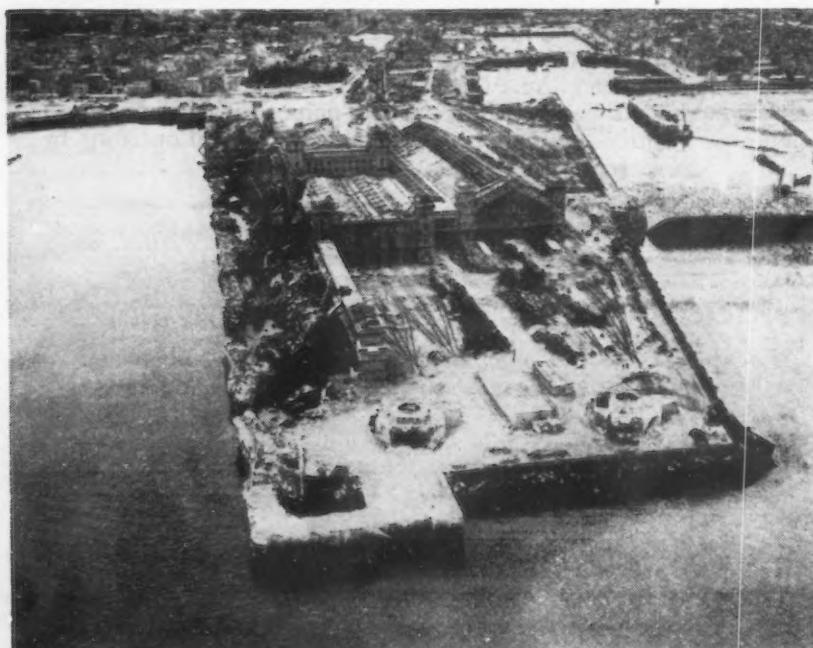
have never been completely sold on sub-low priced cars, feeling that in slack times the lowest fringe of the car market tumbles off into the used car market, and that in good times no such cars are necessary.

Chevrolet should not be in bad shape to reconvert in fairly short order. Its Saginaw foundry needs only to install new forms. Similarly, its forging operations at Saginaw, Muncie and Detroit will be available to undertake this phase of the Chevrolet manufacturing. Gear and axle work has continued at Detroit, Indianapolis and Flint, on war vehicles, so no major reconversion problem is presented. Many assembly points—usable for little more beyond what they were designed for unless quantities of machinery were installed—have been inactive during the war and probably can quickly return to assembly once again. On the debit side, Chevrolet may be embarrassed, like other General Motors division, by lack of press facilities if the war ends quickly.

Backing up this preparedness thinking at the factory is what is generally conceded in the automobile industry to be the most aggressive and substantially based group of retail outlets of any company. Wartime mortality has been very low among these dealers, and lower by proportion of business than numbers. From the merchandising standpoint Chevrolet should be in excellent shape.

A footnote on Chevrolet's war production program should be added. That this job is still first in company thinking is typified by the recent development record on the new 18-cylinder R2800-C Pratt & Whitney aircraft engine. This unit, which develops more than 2000 hp., has a very minimum of parts and production processes interchangeable with the two 14-cylinder models Chevrolet has been building. Despite the necessity of tooling virtually from scratch, the first R2800-C was test run five months and eighteen days from the time the company was asked by the Air Forces to undertake the job. To each a milestone of that sort is more apt to be a 15-month job than one a third that length; in fact, the only example on record within a year is Chevrolet's own, on its first P&W powerplant, produced in 25 days less than a year during the early stages of the war. If Chevrolet shows proportionate speed in reconverting to civilian output, its competitors will have to step lively to keep up.

BLASTED RAILWAY: An aerial photo of a railway station in Cherbourg, France, shows how it was blasted by aerial bombing and navy shelling in the Allied rout of the Nazis.



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• **Spot authorization plan seen becoming more important with good reconversion news expected in next few months... Exemption of small firms in spot plan welcomed by industry.**



WASHINGTON—Good news about reconversion can be expected in the next few months now that the national elections are out of the way. Many government officials feel that the flow of terminations will increase without replacement of new war contracts and that the number of contracts that will be permitted to run out will multiply.

Soon to become important is the spot authorization plan. The plan which has swelled in size and then decreased in the percentage of authorizations will increase greatly as soon as restraints are removed from small companies employing 100 men or less.

The exemption of small firms from production and manpower controls will be welcomed by industry, but the average businessman still has dislike for this procedure which requires him to ask the government what he can produce and to disclose all the pertinent facts about the manufactures he plans.

Manpower can be expected to become slack even before the end of the European war, and now it can be expected that the administration will bend every effort to get workmen into civilian pursuits to the extent that contract terminations create unemployment.

The plan to fill the civilian pipelines with supplies of components and on-the-shelf items can be expected to be dusted off and trotted out. Companies which formerly produced these goods will be encouraged to renew old customer relationships to make it easier for the makers of consumer

durable end products to swing into gear at a faster rate. The automobile industry is very much interested in this idea.

Machine tools will be plentiful, except that special tools orders may have to wait in line. One government official said that as soon as reconversion became a fact instead of a fancy all of the machine tools that have been produced for war but which have not turned up so far no matter how patient a search has been made by government departments, will suddenly drug the market. He said that it was possible that the government would be trying to find as much as 20,000,000 sq. ft. of storage space to house excess tools.

All will not be beer and skittles, though. WPB may find it hard to secure legislative authority to do all the things it will need to do to help reconversion. It will not be because Congress itself will be hostile, but because other departments can be expected to oppose WPB getting the power it needs over the direction of manpower and the handling of contract terminations and surpluses. It is a question of the old bureaucratic struggle for administrative authority.

OPA's reconversion price policies may prevent small new companies from entering fields which were dominated by large old companies because

larger companies can produce in volume and thus reduce manufacturing costs. OPA's insistence upon 1942 prices after the war may result in forming an unbreakable bottleneck for companies wishing to begin new lines. Small volume production of some things will be too costly to encourage risk.

AFINE example of the situation where a 1942 price is involved is the 2,000,000 electric irons programmed by WPB in 1944. On Sept. 30 there were only 80,000 irons produced, and WPB does not expect that more than 150,000 will be made during the rest of the year.

Right now, reluctance to search for material sources upon the part of some civilian goods manufacturers after they have been given prime steel allotments under spot authorization, will force the WPB Steel Division to canvass the industry for them.

Too, belief by some factions at WPB that steel will be tight after X-Day may cause plans for knocking out priorities, to be jacked, and the hope that controls would be snapped may turn out to have been vain.

Still, business will manage to get along some way no matter what complicated rules remain. Many companies whose industry orders have not been placed under the spot authoriza-

GAS AND MORE GAS: Ninth Air Force soldiers are transferring gasoline from delivery trucks at an advanced air base. A single mission by fighter-bombers may require all the gasoline, often loaded into the planes by hand, contained in the hundreds of cans pictured here.



IT HAS TO BE FAST TO GRIND PLASTICS



Grinding plastic tubes on a CINCINNATI No. 2 Centerless Grinder. Stock removal .050" to .075", at a production rate of well over 100" per minute.

You can't afford to spend a lot of time or money machining plastics, and that's why CINCINNATI Centerless Grinders fit so well in the production of such parts. These machines are used extensively for grinding operations on plastic pool balls, electrical insulators, bowling balls, poker chips and tubes and rods of various diameters and lengths. Stock removal may vary anywhere from a fine finish of a few thousandths to a rough grind of rounding up square bars. ¶ The centerless method is ideal for grinding a wide range of parts made from all types of metallic and nonmetallic materials. Cincinnati Application Engineers offer you the benefit of their 20 years of experience in improving centerless grinding procedure.



CINCINNATI No. 2 Centerless Grinding Machine. Catalog G-456-2 contains complete specifications. For a brief description of the Centerless Machines, look in Sweet's Catalog File for Mechanical Industries.



CINCINNATI GRINDERS INCORPORATED

CINCINNATI, OHIO, U.S.A.

CENTERTYPE GRINDING MACHINES . . . CENTERLESS GRINDING MACHINES . . . CENTERLESS LAPING MACHINES

tion plan are very glad because they can get more sympathetic treatment from industry divisions than they can by going through the rigamarole of application under spot authorization.

Company that wants to qualify under the spot authorization plan must usually be in a labor area, not designated by the War Manpower Commission as tight. The first steps to be taken are the securing and filing of the application forms, WPB 4000 (facilities and materials) and WPB 3820 (manpower).

The forms are filled out and returned to the WPB district office where they are processed. One copy of each of the forms is routed to the WMC regional director, and another set is sent to the Area Production Urgency Committee. It takes anywhere from one to two weeks to get a yes or a no.

In the appeals procedure under the plan, WPB has objected that the representatives of the Army and Navy get "two bites at the apple"—once in the Production Urgency Committee and again in the PEC, where applications which are turned down in the states may be reviewed upon appeal.

IN the facilities and materials application, the applicant must show the availability of materials and capacity and his intended schedule. Also, it is required to be shown what new machinery and materials are

needed and where the company expects to seek them. The manpower form must allege the availability of labor and the number of workers required to attain production.

WPB is now trying to get the approval of the War Department to make WMC the only agency which can turn applications down on grounds of a manpower shortage. WPB argues that the Byrnes manpower directive of Aug. 4 granted the entire authority in this to WMC. WMC agrees.

One sure post-election result is the breaking of the little steel formula and this will raise production costs to the point where OPA will have to give price relief. Labor costs are already up from 25 to 50 per cent, and the OPA insistence upon 1942 prices will cause many a small businessman to think twice before risking his capital.

* * *

State buying and conduct of foreign trade may guarantee some of the postwar jobs offered by the administration. However, some of the 60,000,000 jobs spoken of by the President may not be in the United States. Government officials speak of postwar exporting American skilled labor as well as materials and engineers to help industrialize the United Nations and reconstruct war devastated countries.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



War Contracts Worth Billions Have Been Cancelled by Army

Washington

• • • War contracts have been cancelled which would have cost approximately \$12,000,000,000 if completed, according to announcement made by the War Department. Since termination of war contracts began, a grand total of 29,354 fixed price contracts have been cancelled, and of this amount 25,560 have already been settled. Of these cancellations, \$7,794,280,000 worth has been settled by payment to contractors of \$330,100,000.

During the month of September 1944 fixed price contracts were terminated and 1416 terminated contracts were settled, the largest total of contract terminations in the fixed price field since June. Claims paid to contractors in that month amounted to \$21,180,000 according to Brig. Gen. David N. Hauseman, Director of the Readjustment Division.

The results to date, General Hauseman's report states, leaves 3874 terminated fixed price contracts still in process. "Three thousand of these contracts remained unsettled, because contractors have submitted no claims."

In commenting further, General Hauseman said: "The War Department believes, and is acting on its belief, that the settlement of terminated contracts can be materially speeded if contractors will give immediate attention to their part of the job and get their claims in."

Monsanto Starts Texas Plant for Ordnance Dept.

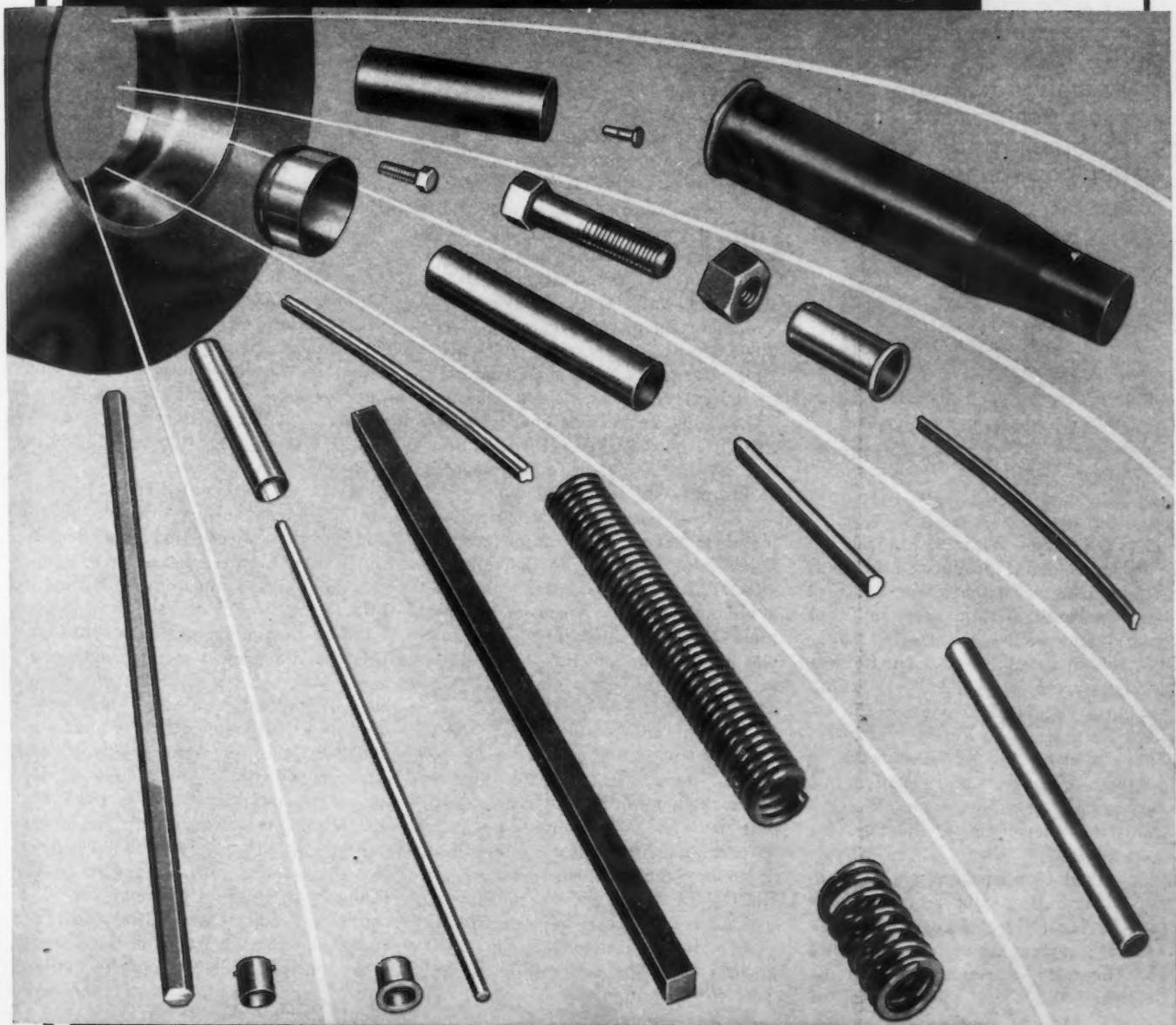
St. Louis

• • • Monsanto Chemical Co. will design, build and operate for Army ordnance a new \$8,000,000 plant adjoining the Monsanto-operated Longhorn Ordnance Works, Karnack, Tex.

The new plant will produce a product which has been developed and perfected during the past two years by chemists in Monsanto's central research laboratories at Dayton, Ohio. The new plant will be operated as a part of the company's organic division, and will be under the direction of D. L. Eynon, plant manager of the Longhorn Works. The first unit will occupy about 2000 acres. Construction is scheduled to start almost immediately.

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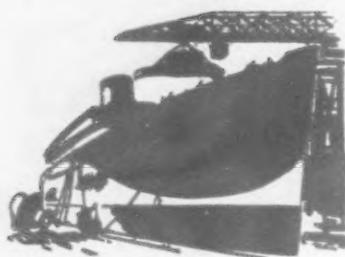
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WEST COAST . . .

OSGOOD MURDOCK

• With a \$148,000,000 war-born light metal industry and \$971,000,000 in new government facilities and installations, the Inland Empire in Washington State presents postwar industrial problems and fascinating possibilities.



SPOKANE—With a \$148,000,000 light metal production industry sprung from the womb, nurtured and matured within the last four years, and with an estimated \$871,000,000 invested in 48 separate war industry projects and installations within a radius of 150 miles, the Inland Empire of the Pacific Northwest offers another one of those startling postwar questions and challenging, fascinating possibilities in Western industrial development during the next decade.

Up until 1940 Spokane was a trading, distributing and supply center for the lake, river, forest, mine and soil rich region between the Rockies and Cascades east and west and the Selkirks and Blue Mountains of eastern Oregon north and south. Three trans-continental railroads pass through it on their main line, the Great Northern, the Northern Pacific and the Milwaukee. Two others, the Union Pacific and the Canadian Pacific, tie in with traffic laterals.

Mines of the Inland Empire, principally in the Coeur d'Alene district of northern Idaho, produce one-eighth of the nation's zinc, one-fourth of its silver and tungsten, one-third of its lead and three-fourths of its magnesite, principally through the Northwest Magnesite Co. at Chewelah, 50 miles northwest of Spokane. Lumbering is also big business with the two largest white pine saw mills in the world, and the city has been a major

supply point for rich agricultural wheat and pea growing areas and for important long-run government projects through the Forest Service, the Bureau of Mines, the Indian Service and various functions of the Departments of Agriculture and Interior.

When the Grand Coulee Dam raised the Upper Columbia River 300 or 400 ft. above its old channel about 75 miles west of Spokane, a new industrial era was dawning just as the war came on. So they postponed the irrigation and reclamation of 1,200,000 arid but fertile lands in the Columbia Basin to develop ultimately 2,646,000 hp. of electric energy, three times Niagara's output. In January of the current year, Coulee generated 604,000,000 kw. hr. of energy, establishing a new world's record, and output is increasing as emergency installations can be completed.

This war-born Inland Empire light metal industry on a major scale is immediately adjacent to Spokane and all DPC. The reduction plant at Meade operated by Alcoa has six pot-lines with four operating. Responsible Washington officials have stated in writing that this is the lowest cost operation of the nine DPC reduction plants throughout the nation, showing a cost of 11.87c. per lb. for operation in June, 1944, excluding overhead, which might add another quarter cent per lb. At Trentwood is the Alcoa-managed aluminum rolling mill, the only such facilities west of the Mississippi River and the most modern plant for this purpose in the world. It is locally claimed that a world record for hot rolling of aircraft sheet aluminum was made April 7, this year, when a crew of 50 turned out the skin for 101 Flying Fortresses in eight hours.

Although there has been mystery and secrecy there is probably the greatest postwar possibility and significance in the magnesium reduction plant being operated by Electro-Metallurgical Co. It is understood to have a 48,000,000 lb. capacity and to be operating at approximately 50 per cent. It operates by the silica-thermic method and takes advantage of the nearby principal national source for magnesite.

AT Washington State College, Pullman, about 75 miles south of Spokane, a pilot plant for testing the carbo-thermic method of production

of magnesium is operated by the U. S. Bureau of Mines producing 100 lb. of magnesium daily, to obtain more complete operating data and to determine optimum conditions. Technical men, economists and all industry-minded operators in the Inland Empire were especially gratified last month when Dr. Wilson Martindale Compton accepted the presidency of the State College at Pullman, succeeding Dr. E. O. Holland on his retirement. Dr. Compton has been secretary and manager of the National Lumber Manufacturers Association at Washington for the past 25 years, and his distinguished brothers are Dr. Carl Taylor Compton, president of Massachusetts Institute of Technology, and Dr. Arthur Holley Compton, University of Chicago physicist and Nobel prize winner.

It is locally estimated that the Federal Government has invested \$871,000,000 in projects and facilities in the Inland Empire, including in addition to Coulee Dam and the Spokane light metal industry, the hush-hush Du Pont managed gigantic Hanford Engineering project on the south and west bank of the middle Columbia, east of Yakima and north and west of Pasco. Nearby there are \$139,000,000 worth of Army airfields including principally the Geiger Field major repair base. There is the \$24,000,000 Naval Reserve air training station at Pasco, the \$49,000,000 Naval training center at Farrugut, Idaho, with original capacity for 70,000 where 40,000 are still housed, a \$6,000,000 Baxter Army hospital and other major Federal facilities with payroll, investments and demand for supplies.

The city of Spokane had a population of 122,000 in 1940 and it is estimated now at 142,000. The estimated population of the Inland Empire is now three quarters of a million, but that includes extensive temporary military personnel. However, when they get the water on those million acres of Columbia Basin, the tributary population is sure to increase and develop to hold this figure within the next decade.

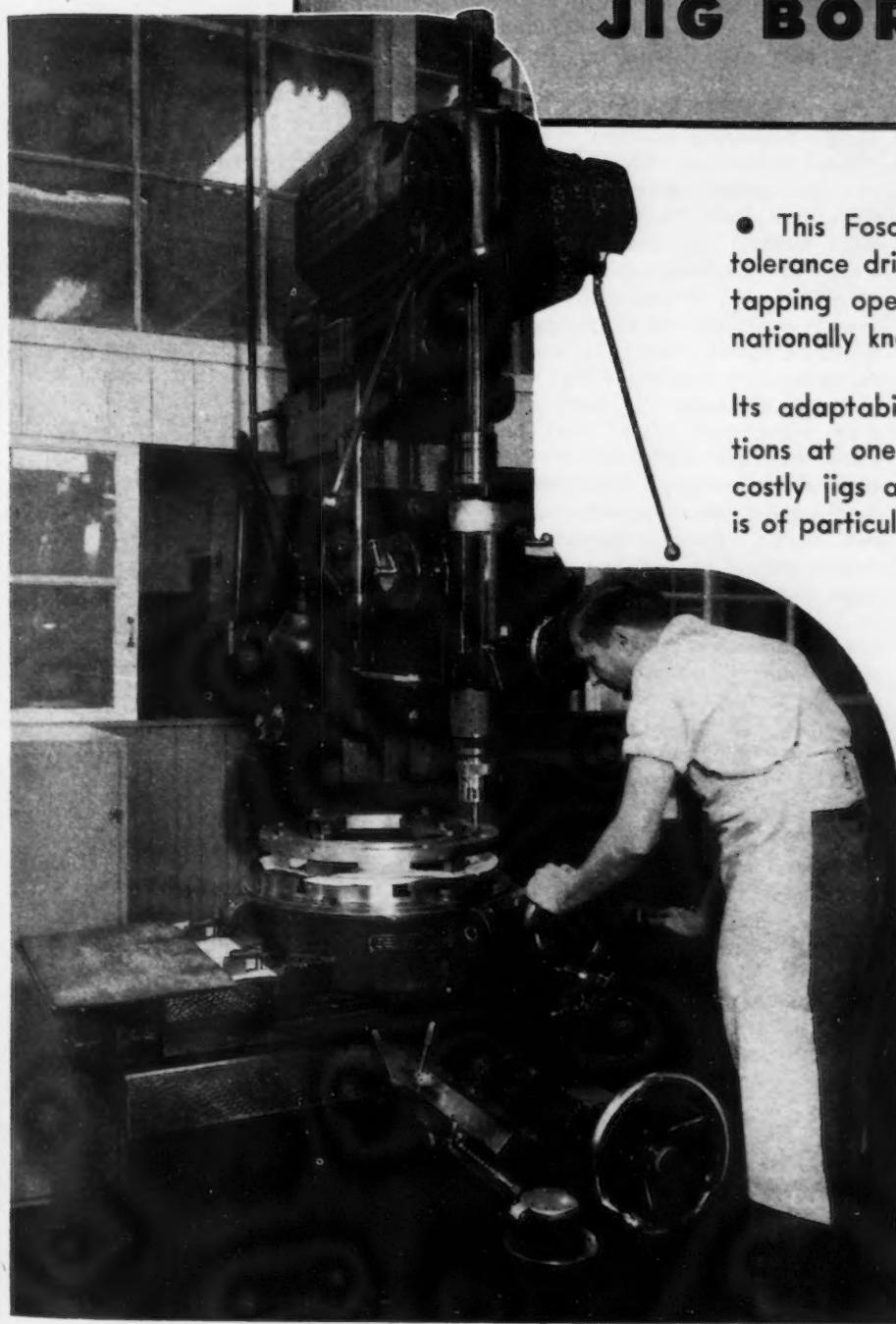
SPOKANE has always had a well-managed, responsive and publicly supported Chamber of Commerce. Even more important now, to anticipate and develop postwar industries, is Inland Empire Industrial Research,



For Speed. Precision. Economy

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JIG BORER



• This Fosdick Jig Borer is meeting close tolerance drilling — boring — reaming — and tapping operations in the tool room of a nationally known manufacturer's plant.

Its adaptability to a wide range of operations at one setting eliminates necessity for costly jigs and fixtures on many jobs. This is of particular value on small lots.

The heavy duty column — sturdy spindle support — substantial knee structure provide the necessary rigidity to produce consistently accurate work. For extreme precision work, measuring rods and dial indicators are furnished with the machine at an additional charge.

For precision drilling — boring — reaming and light milling operations use a Fosdick Jig Borer.

Full descriptive bulletin available — ask for Jig Borer Bulletin J.B.I.

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WEST COAST

Inc., a private development enterprise set up by 15 civic minded, local leaders, including such powers in the community as W. H. Cowles, publisher of the *Spokesman Review* and *Chronicle*, Kinsey S. Robinson, president, Washington Water Power Co., and Harlan Peyton, president, Spokane Chamber of Commerce and local capitalist and estate manager. Don W. Walters is executive manager, an industrial engineer and management counsellor, formerly with the Smaller War Plants Corp. and in government and private industry service. With an engineering approach and with power to act in private interest, this organization is setup to serve as a practical, effective, clearing-house and expediting agency for national manufacturers interested in facilities which the Inland Empire has to offer, and for local plant facilities and natural resources in converting major wartime enterprises, frightfully un-integrated and with future market, traffic and freight rate problems to puzzle a Houdini.

Mr. Walters and his associates seem realistic and far-sighted in their practical attempt to integrate Spokane's big block of low cost electric power, its natural resources, its war installed manufacturing facilities and its proudly proved excellence in productive manpower. With its rivers and lakes, its forests and mountains, its nearby hunting, fishing and outdoors, it is indeed a pleasant and promising place to live and settle and there seems no reason why, in the coming century of the Pacific and with the further industrialization of the West Coast, the Inland Empire may not be a far more important and significant manufacturing and industrial point than it has been in the past.

WATER transportation will be feasible on the Columbia River as far as Pasco, in all probability, to reduce the back-haul freight rate from Seattle, Tacoma and Portland. Before the war, Spokane and its tributary territory, was a prime market for Colorado Fuel & Iron Co.'s steel from Pueblo and, by the vagaries of freight traffic schedules, CF & I could sell wire products, light structural and its mill products at advantage here. Naturally Spokane could be economically supplied also by steel products from Geneva, although it takes over 24 hr. to travel by circuitous train connections from Spokane to Salt Lake, nevertheless actual railroad mileage is not nearly as long

as elapsed traveling time would indicate.

Level-headed, well-financed, realistic local business leaders feel that, if these light metal plants are sold to responsible private operators and if secondary fabricating, assembly and derivative product manufacturing industries are added, Spokane should become quite a manufacturing point for light metal products and assembly. Perhaps two forerunners or weathervanes are Brown Industries, Inc., at Spokane and the Pullman Northwest Co. at Pullman. Thoborn Brown, founder of the former concern now has with him A. A. Kearney, former managing engineer of Inland Empire Industries. Aluminum sheets and magnesium castings have been introduced into the construction of truck bodies to reduce the weight of a standard Quartermaster truck from 14,000 lb. to 7500 lb. with capacity for the same load and complying with the same specifications. It is locally suggested and anticipated that manufacturers and assembly plants of this type might well adapt local light metal raw materials and available machine processing and assembly facilities for the supply of commodities in the Pacific Northwest, even though motors and critical, essential parts were manufactured in the East or Midwest and shipped separately. The Pullman concern is a light metal alloy foundry which is developing casting techniques, working closely with the pilot plant at the State College but applying developments to practical commercial operations.

SAN FRANCISCO — Bay area foundrymen acknowledge a falling off in volume running to 33 1/3 per cent. In some instances the decline reaches a temporary figure of even greater proportions. In the somewhat isolated instances where the decline has been greater, contracts have been split and work diverted to slack plants.

Peak production has apparently been passed here in a list of Naval and Maritime products ranging from mooring anchors through torpedo tubes and mounts to water buffaloes and stern frames. Shipbuilding contracts are terminating with ships on the way in two yards, and two yards are being dismantled.

At present the foundry slowdown remains spotty, as some continue to supply equipment for existing contracts. While the condition is not yet sufficiently well defined to be classed as a definite trend, foundry

men realize that their plants may perhaps be the first to show signs that coast production has passed its peak.

One of the largest foundries in the area has already returned to production of railroad equipment, its pre-war specialty. This firm is already turning out bolsters and side frames. Another, a diesel engine manufacturer, is gratified by its mounting volume of private business. It is producing for lend-lease and figuring on other foreign contracts. Simultaneously it is shipping food processing equipment to South Africa and Iceland.

General Engineering and Dry Dock Co. has taken over the neighboring Pacific Bridge Co. shipyard at Alameda under terms of an Emergency Plant Facility contract.

The Pacific Bridge Co. a construction firm, had been building steel floating drydocks for the Navy until the contracts were completed. General Engineering is building small Naval craft at its Alameda yard and is an important factor in the repair business.

Clarence F. Jensky has been appointed head of a newly created turbine sales division of the Joshua Hendy Iron Works, Sunnyvale, Calif., with Perry J. Collonge as assistant sales manager. Joshua Hendy has reopened its San Francisco sales offices on the tenth floor of the Flatiron Building, 544 Market St.

Financial control of International Derrick and Equipment Co., Torrance, Calif., has been acquired by Dresser Industries, Inc., a group of ten commonly owned manufacturing companies. International Stacey Corp., former owners of International Derrick has been dissolved.

Kropp Wages Modified

Chicago

• • • Wage modifications for employees of Kropp Forge Co. and Kropp Forge Aviation Co., Chicago, have been approved by the Sixth Regional War Labor Board. A joint application of the company and the Kropp Forge Employees Association, affecting 619 workers, was partially approved, including increases in minimum rates of seven job classifications. Proposed increases of 5c. to 20c. per hr. in maximum rates for various rate ranges were denied.

Meet the three sheet steel "Paint-Grippers"

These paintable surface-treated sheet steels suggest many new cost-saving, product-improving opportunities.

Two of these special ARMCO PAINTGRIP sheet steels are given the definite rust protection of zinc coatings before they are Bonderized at the mill. Bonderizing neutralizes the chemical action of zinc on paint; it prevents premature flaking and peeling of the paint or enamel. Moreover, it eliminates all "makeready" costs before painting.

There are three ARMCO PAINTGRIP grades—a surface-treated sheet for every requirement. One of them is likely to "fill the bill" for you.



1



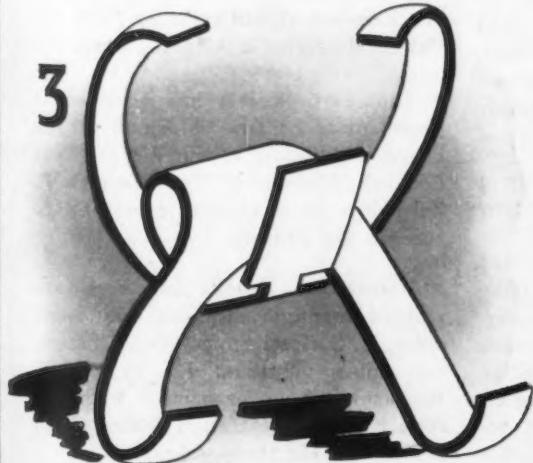
1. The ARMCO Cold Rolled PAINTGRIP "Man" has a light electrolytic "flash" of zinc under a Bonderized surface. He will draw, form, weld, and solder readily. His uniformly smooth surface insures a handsome appearance when painted. He is ideal for products that are not subjected to severe corrosive conditions. Before painting he resists rust during shipment and in normal storage conditions.

2



2. For utmost rust-protection in corrosive applications, the ARMCO Galvanized PAINTGRIP "Man" gets a full zinc coating and then is mill-Bonderized. Like others in the family, he takes paint readily and helps preserve it. His habits in forming operations are good, but if you want deep-drawing qualities you'll want to meet . . .

3



3. ARMCO ZINCGRIP-PAINTGRIP. He's the born-contortionist of the zinc-coated family. His forming and deep-drawing qualities are excellent; his full zinc coating clings tightly to seams and corners as well as flat parts. He takes and holds paint as well as the rest of the family. (For zinc-coated products that do not require painting, ARMCO ZINCGRIP without the PAINTGRIP treatment can be specified).

★ ★ ★

Write us for more information about these paint-gripping sheet steels. They can make your products look smoother and more attractive and make them last longer. Just address The American Rolling Mill Company, 3361 Curtis Street, Middletown, Ohio.

THE AMERICAN ROLLING MILL COMPANY

PERSONALS

• **Porter R. Wray** has been appointed manager of the Alloy Bureau of the Metallurgical Division, Pittsburgh district, Carnegie-Illinois Steel Corp. Mr. Wray has been associated with U. S. Steel subsidiaries since 1934. He became contact representative for Carnegie-Illinois' Alloy Bureau in Pittsburgh in 1937, bureau manager of the Stainless Division of the Pittsburgh Metallurgical Department, in 1941, and assistant to the chief metallurgist of the Duquesne Works in 1943, the position he leaves for his present appointment.

• **Russell C. Taylor**, vice-president in charge of general line manufacturing for the American Can Co., New York, has assumed responsibility for all the company's container manufacturing plants, both general line and packer's. Mr. Taylor, who is also a director of the company, joined the organization in 1926. After service in the company's manufacturing plants in the United States and Hawaii, Mr. Taylor became general manager of manufacture prior to his election as vice-president in 1940. **S. D. Arms** has been named general manager of manufacture and **Edmund Hoffman**, manager of the industrial relations department.

• **L. V. Nagle** has been appointed vice-president in charge of national sales for the Udylite Corp., Detroit. Mr. Nagle has been Michigan sales manager for the company for the last 13 years. **Donald C. Blum** has been made Udylite's service engineer for the Buffalo-Rochester area.

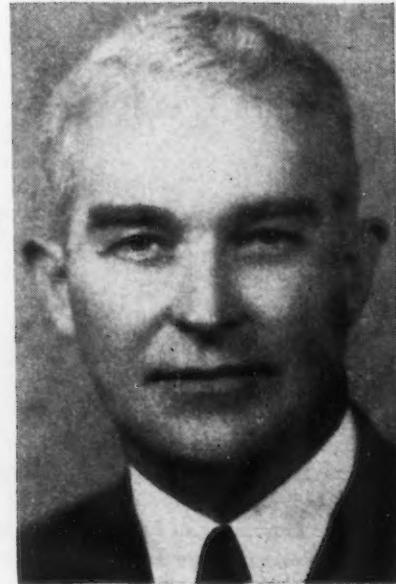
• **R. J. Warner** has been elected president and general manager of Rockford Drilling Machine Division, Borg-Warner Corp., Chicago, succeeding **E. C. Traner**, who has retired from active direction after 25 years of service.

• **Jack W. Forbes** has been appointed sales manager of the Wickwire Spencer Metallurgical Corp., Newark, N. J., subsidiary of the Wickwire Spencer Steel Co. Prior to his association with Wickwire Spencer, Mr. Forbes was with the Western Electric Co.

• **Herman A. Everlien** has been appointed general sales manager of the Mechanical Goods Division, U. S. Rubber Co., New York, and **Walter F. Spoerl** has been made merchandise manager of the division.



JOHN J. DAVIS, JR., manager, and JOHN A. ENGLISH, JR., assistant manager, railroad sales, Carnegie-Illinois Steel Corp.



• **John A. English, Jr.**, has been appointed assistant manager, railroad sales, Carnegie-Illinois Steel Corp., Chicago. John J. Davis, Jr. is manager. Mr. English joined Carnegie-Illinois 14 years ago and for the past 7 years has been sales engineer. **Marcus J. Aurelius**, formerly sales engineer, Chicago, has been appointed assistant to manager of sales, Railroad Materials and Commercial Forgings Division, Pittsburgh.

• **Norman M. Sedgwick** has been appointed manager of compressor sales by the Le Roi Co., Milwaukee. Mr. Sedgwick, who joined the firm in 1928, has succeeded **Donald Heffron**, resigned.

• **R. E. S. Geare** has been retained as consulting engineer for the Norwalk Tire & Rubber Co., Norwalk, Conn.

• **Paul E. Bradfield**, since 1923 a Pacific Coast mechanical engineer, has joined F. J. Hearty & Co., California representative of the Edward Valve & Mfg. Co., Inc., East Chicago, Ind.

• **J. R. Randle** has been made field service engineer of the Shunk Mfg. Co., Bucyrus, Ohio. For the past two years Mr. Randle was field engineer for the Cleveland Rock Drill Co.

• **John D'Agostino**, until recently a member of the Brazilian Military Commission purchasing staff in Washington, has been appointed South American representative of the Simmons Machine Tool Corp., Albany, N. Y., and will make his headquarters in Rio de Janeiro. Mr. D'Agostino will assist South American metalworking plants in their postwar industrial expansion.

• **George R. Allen** has been appointed general sales manager of the Brass Division, Kerotest Mfg. Co., Pittsburgh. For the past eight years, Mr. Allen has been associated with Mueller Brass Co. as sales manager of their Standard Products Division.

• **Felix N. Williams**, general manager of Monsanto Chemical Co.'s plastics division at Springfield, Mass., has been elected a vice-president of the company. He came to Monsanto through the acquisition of Swann Chemical Co. with which he had been associated.

• **Lyle E. Hill**, for two years priorities supervisor and special traveling representative of the purchasing department, Caterpillar Tractor Co., Peoria, Ill., has returned to his former post as head of the railroad power division, Engine Sales Department.

• **Frederick J. Knack**, well-known aeronautical engineer and designer, has been named vice-president in charge of engineering of the Luscombe Airplane Corp., Trenton, N. J. Mr. Knack resigned recently from the Fairchild Engine & Airplane Corp.

• **Thomas I. Shriner** has resigned as president to become chairman of the board of directors of the V & O Press Co., Inc., Hudson, N. Y. **Herman F. Zorn** has been elected president to succeed Mr. Shriner.

• **Norman G. Brooks** has been appointed manager, Kansas City sales office, U. S. Steel Supply Co., Chicago, succeeding William E. Fry. Mr. Brooks has been associated with the supply company, United States Steel subsidiary, for three years.



A. A. WAGNER, manager of sales of hot rolled products, Jones & Laughlin Steel Corp.



W. T. McCARGO, Eastern regional sales manager, Carborundum Co.



KARL H. MEYER, manager, Marine Division, Reliance Electric & Engineering Co.

• A. A. Wagner, has resigned as chief of the WPB Carbon Bar and Semi-Finished Branch to return to the Jones & Laughlin Steel Corp., Pittsburgh, as manager of sales of hot rolled products. Mr. Wagner will be succeeded by P. J. Sandmaier, now deputy of that branch. Mr. Sandmaier before joining WPB was assistant manager of orders of the Republic Steel Corp., Cleveland.

• L. F. Quigg, formerly vice-president in charge of operations, Colorado Fuel & Iron Corp., Denver, has been elected director, member of the executive committee, and executive vice-president.

• Robert M. Stanley, chief test pilot and director of the Flight Research Division, Bell Aircraft Corp., Buffalo, has been appointed chief engineer of the company's Niagara Frontier Division. He will assume the duties of Harland M. Poyer, director of production engineering, who has resigned.

• John C. Howard, director of the ODT's Division of Rates, has resigned to join the traffic organization of the Bethlehem Steel Co., Bethlehem, Pa.

• M. H. Corbin has been elected a director of the Standard Varnish Works, New York, and was appointed vice-president in charge of sales of both the New York and Chicago divisions. Mr. Corbin has been associated with Standard Varnish Works since 1937 and for the past two years he has been manager of industrial sales of the New York plant.

• W. T. McCargo has been appointed Eastern regional sales manager of the Carborundum Co., Niagara Falls, N. Y., succeeding in that capacity F. Jerome Tone, Jr., who has been named vice-president in charge of sales. Mr. McCargo returns to the Carborundum Co. after having served with the War Department since 1940. Prior to assuming his duties in Washington he had been with the Carborundum Co. for 13 years as abrasive engineer.

• Omer L. Woodson has been appointed vice-president and general manager of the Ryan Aeronautical Co., San Diego, Cal. Mr. Woodson for the past five years was vice-president of Bell Aircraft Corp., and since 1942 general manager of its Marietta, Ga., plant.

• Karl H. Meyer has been appointed manager of the new Marine Division of the Reliance Electric & Engineering Co., Cleveland. Mr. Meyer has been associated with Reliance since 1926 and has been superintendent of the marine plant and works engineer at the main plant.

• A. M. Buxton has been promoted to assistant sales manager of the Cooper-Bessemer Corp., Mt. Vernon, Ohio. He will also direct the company's oil and gas field sales. Mr. Buxton has been with Cooper-Bessemer for 20 years.

• Thomas M. Thornton has been appointed field engineer in Detroit by Norton Co., Worcester, Mass. R. C. Willey has been appointed abrasive engineer in Pittsburgh; Ralph E. Rasmussen succeeds Mr. Willey as office manager of the Pittsburgh warehouse.

OBITUARY...

• Frank A. Merrick, vice-chairman, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and Westinghouse president from 1929 until 1938, died recently in Hamilton, Ont., Canada. He was 75 years old. Mr. Merrick became affiliated with Westinghouse when that company purchased the Steel Motors Co. in 1902, of which he was manager and chief engineer. He took charge of building the Canadian Westinghouse Co. in 1903, becoming superintendent, later vice-president and general manager. Mr. Merrick became vice-president and general manager of the parent company in 1925 and its president in 1929.

• Edwin C. Nagel, president of Essex Brass Corp., Detroit, died recently. Before he became president of Essex in 1918 he was associated with Lavigne Mfg. Co., now the Commonwealth Brass Corp., which he helped organize.

• George H. Pratt, sales manager of the Cushman Chuck Co., Hartford, for 20 years prior to his retirement in 1937, died October 21.

• John W. Berscheid, 68, superintendent of Fairfield Wire Works of the Tennessee Coal, Iron & Railroad Co., Birmingham, from 1931 to his retirement five years ago, died November 1. Mr. Berscheid had served as superintendent of the American Steel & Wire Co.'s mills at DeKalb, Joliet and Waukegan, Ill., prior to 1931.

Fatigue Cracks.

BY A. H. DIX

Brush-Off By Life

• • • Life does not agree that its recent close-up of Robert G. LeTourneau would be perfect if it included the news that the earth-moving equipment genius is an avid devourer of your favorite family journal. The brush-off reads:

Many thanks for giving us the interesting sidelight on Mr. LeTourneau's omnivorous reading habits. Limitations of space prevent our sharing this bit of information with our readers.

—Edith M. Smith—for the Editors

Edith misses the point. If Mr. LeT. were an omnivorous reader we would not be shouting ourself hoarse over the letter from Roland S. (R. G. LeTourneau, Inc.) Neff. But Mr. LeT. is not an omnivorous reader. He is a selective reader, in proof of which we quote from Mr. Neff's letter:

Mr. LeT. is one of your most ardent readers. In the cabin of his Lockheed-12 I counted not one but five copies of Iron Age.

This does not say specifically that Mr. LeT. is not ardent about some of our contemporaries. However, we like to think in our biased way that we are No. 1 in the industrial journal ventricle of the LeTourneau heart, and if we are not we hope no one will undeceive us.

Aprononym

... Co-author of the new book, "Juvenile Delinquency," is Prof. Walter C. Reckless.

—F. J. O.

The Joshua Hendy Iron Works' welding superintendent is Leo Berner, an apronym sent in by Comdr. L. H. Burkhead, of San Francisco, who, with the change of an "r" for an "l," would himself be a 24-kt. apronym.

Two Terms Later Still No Dice

• • • We were going through our "curiosity" file the other day and have selected for re-airing without comment this letter written to us on Apr. 2, 1941:

Your subscription invoice for 1941 has just come to hand.

After the second re-election of Franklin D. Roosevelt, the attitude in your leading articles has become openly hostile towards Germany and absolutely devoid of objectivity, so we could not think of continuing to subscribe.

Heil Hitler!
Ruhrstahl Aktiengesellschaft,
Hattingen-Ruhr

No Nod By Williams

... It is always fun to find pinholes in Williams' superb cartoons, so leave us turn to the Nov. 2 one and note that though the poor guy's coat is whirling rapidly around the crankshaft in the lathe, the crankshaft itself is standing still.

Or is it just one of those high velocity coats which, like the old Mercer roadster with the brass oil pump on the outside, look as if they are going 40 m.p.h. even when standing still?
—Deac



The short curved lines over the throw of the crankshaft show that the crankshaft is revolving. "The Bull of the Woods" cartoons are X-rayed and Magnafluxed before release, and are warranted free from technical flaws. The greater apparent velocity of the coat is more than an exercise of artistic license; it is an exaggeration required by the laws of cartooning.

Aside To England

• • • For the benefit of our English subscribers we would like to explain that the use of the phrase "leave us turn" is not evidence of ignorance on Deac's part. Deac, a cultured gentleman, is playfully employing a style popularized by Ed Gardner, No. 1 man on the topshelf radio show, "Duffy's Tavern," which requires that the verb "leave" be substituted for "let."

Sour Syllables

• • • Music is what our fellow-worker, B. L. Herman, finds in this phrase he picked out of a letter on the "Dear Editor" page:

... pickle polishing for the removal of burrs after grinding.

Wherever possible we like to agree with our fellow-workers, but after trying hard to like it, we must confess that the phrase does not send us. We still prefer "Was this the face that launched a thousand ships?" and "She walks in beauty like the night."

However, we must in fairness grant that these are the eclair type of lines, while the "pickle-polishing-burrs-grinding" combination is distinctly sauerbraten. Not being among those whose gastric juices gush generously at the mere mention of this dish, we disqualify ourself as a judge, hoping that we have not failed to convey the impression that we think our fellow-worker's taste in appetizing syllables is bizarre.

Wanted: Name for Covert Clippers

... Some years ago an article appeared in our f. f. j. dealing with folks who cut out full or part pages, causing others no little annoyance, and in some cases destroying vital sections of interesting articles.

At that time you dug up an obsolete name for them. Can you locate it for me?

—E. J. Kummeling,
1806 Pine St., St. Louis 5

It did not appear here. We know of no appropriate term. "Vandal" does not fit, for a vandal's joy is not tempered by a desire for the object defaced, and the assumption is that the clipper's craving is so great as to momentarily outweigh his Christian principles.

Although the practice is reprehensible and indefensible, it can be argued that nothing that has ever appeared in print so stimulates the imagination as a clipped space. The excision might have contained the answer to the problem of squaring the circle, or even the magic formula whereby the candidate who is elected between the time this is written and the time you see it may reduce the national debt and at that same time lower taxes.

Is there a man who, while waiting in say the silence of a doctor's office, has not been tempted to remove a choice paragraph or page from a magazine? If he refrains, not from consideration of others' rights, but because the tearing sound will advertise his act to the other patients, he is certain to set up within himself a repression. To avoid this, he should arm himself with a small, sharp penknife.

By its practice of sending promptly upon request free clippings of any article desired, your favorite family journal starches the moral backbone of those of its readers who are tempted to clip from copies to be read by others.

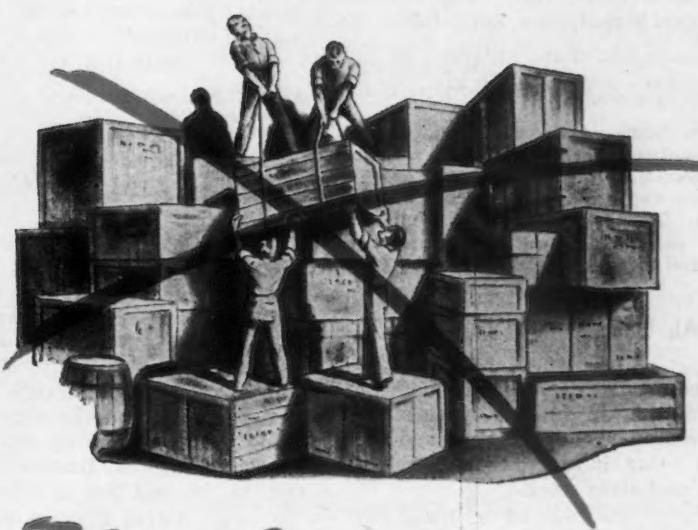
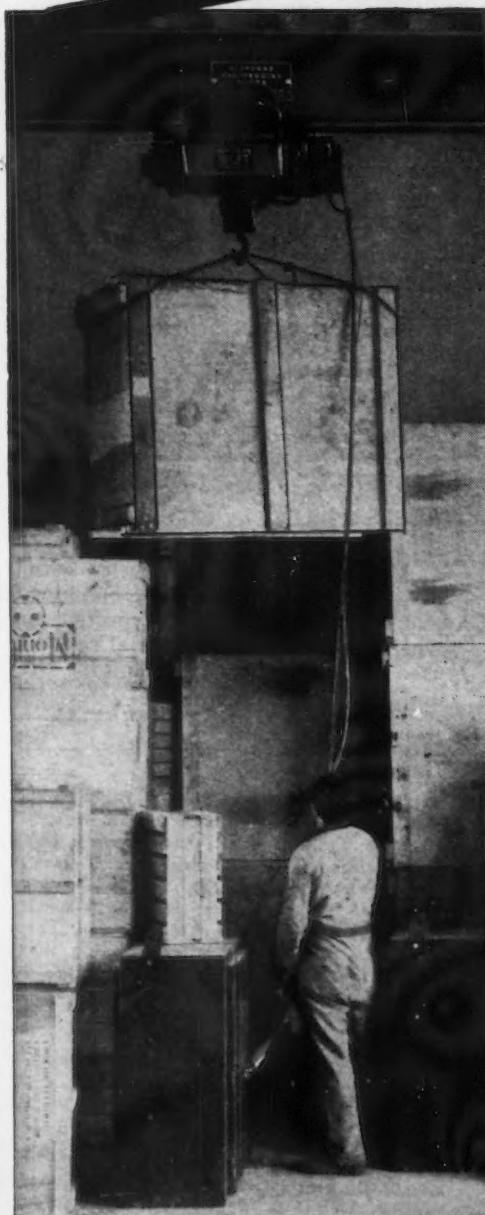
Puzzles

• • • If you are interested in Mr. Foster's method of expressing, with five 3s, every number from 1 to 31 inclusive, write us at 100 E. 42nd St., New York 17.

You can sit in the front row for the week if you answer this correctly within ten seconds:

Suppose the earth were a perfect sphere 2500 miles in circumference, and suppose a telephone line were erected on poles about the equator. Assuming that the telephone wire would then form a circle concentric with the equator, would a man be able to walk under the wire without touching it if the total length of the wire exceeded the circumference of the earth by 50 ft.?

HOIST POWER *SAVES* manpower



Northern

HI-LIFT ELECTRIC HOISTS are available for prompt delivery

Until we are close to victory, the manpower situation is likely to continue difficult. Many plants will not have enough men, and man-hours will be costly.

Good hoist equipment makes better use of manpower—enables men to do more work with less effort—conserves costly man-hours. Look over your plant—you'll find many places where improved hoist equipment will save.

Northern Hi-Lift, Low Headroom Electric Hoists are available for prompt delivery. Increased capacity and improved manufacturing methods enable us to fill orders rapidly. These hoists are built to "take it", over a long period with an absolute minimum of attention. One-piece, welded steel frames—turned and ground shafts—large size roller bearings—machine-cut, heat treated gearing—splash lubrication—assure long life and low maintenance.

The Hi-Lift feature makes better use of headroom—increases the effective height of plants—makes easier the handling of bulky loads.

Write or phone for quotations



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ENGINEERING WORKS**

General Office: 2607 Atwater St., Detroit 7, Mich.

NORTHERN CRANE & HOIST WORKS LIMITED, WINDSOR, CANADA

OFFICES IN PRINCIPAL CITIES

Dear Editor:

THICKNESS GAGE

Sir:

Your Aug. 17 "News Front" mentions an X-ray thickness gage for continuously checking sheet steel thickness as it comes right from the roll. Can you supply me with fuller details?

W. R. BAYLEY
Guest, Keen & Nettlefords, Ltd.,
Cardiff, England

● The name of the developer, a large electrical company, cannot yet be divulged. However, we are forwarding your letter to the firm and it may communicate with you direct. See also the article in the Nov. 9 issue, page 59, "Supersonic Measurement of Metal Thickness."—Ed.

METAL USES

Sir:

Where can we obtain fundamental information on various types of ferrous and non-ferrous metals and their uses? Our interest is in tube, bar, sheet and strip stock.

ROBERT T. DRAZEN,
Secretary
Drazen Lumber Co.,
144 Water St.,
New Haven, Conn.

● A few of the many works on this subject are: "Engineering Alloys," issued by the American Society for Metals, Cleveland; "A List of Alloys With Physical Properties of Typical Alloys," American Society for Testing Materials, Philadelphia; "Ferrous and Non-Ferrous Materials of Construction for Chemical Engineering Equipment," "Chemical and Metallurgical Engineering," Cleveland; and "Directory of Materials," "Machine Design," Penton Bldg., Cleveland.—Ed.

HIGH SPEED STEEL PRICE

Sir:

What was the average price for 18-4-1 high speed steel for the past ten years?

OSCAR L. MILLS,
President
Mills Alloys, Inc.,
11320 So. Alameda St.,
Los Angeles 2

● For the year 1935, 57¢ lb., May, 1936, 55¢; Jan., 1937, 60¢; March, 1937 to date, 67¢.—Ed.

THREAD ROLLING PRACTICE

Sir:

The information in your Nov. 2 and 9 issues, entitled "An Appraisal of Precision Thread Rolling Practice," by Frank J. Oliver, contains much valuable data we have never before seen in print. As we do thread rolling on some of our products, these articles would be of considerable help. Could we get clippings?

T. B. SMITH,
President
John Hassall, Inc.,
Clay and Oakland Sts.,
Brooklyn 22

● Mailed.—Ed.

DIE MATERIALS

Sir:

I was very much interested in your Oct. 12 leading article, "New Developments in Die Materials." If you have reprints of either the article or the charts, please inform me how these may be obtained.

DONALD C. MCINTYRE,
Tool Engineer
Eastern Aircraft Division,
General Motors Corp.,
Linden, N. J.

● Reprint of the article, including the charts, is being sent you.—Ed.

WANTED

Sir:

Our engineers have requested tear sheets of the series on time study in your Aug. 17, Sept. 28 and Oct. 19 issues. They also want "New Developments in Die Materials" in your Oct. 12 issue, and the series, "Measuring and Designating Surface Finishing," by James A. Broadston, in your Oct. 19, 26, and Nov. 2 issues.

MISS L. N. SODERMAN,
Librarian
Curtiss-Wright Corp.,
Development Division,
Bloomfield, N. J.

● The time study series is being reprinted with related articles. Copies will be supplied at cost. A reprint of "New Developments in Die Materials" is being sent you with our compliments, as are also tear sheets of the series by James A. Broadston.—Ed.

CONTRACT TERMINATION

Sir:

I will appreciate your sending me, at your earliest convenience, six reprints of "What to do Before Contract Termination," by Eugene Caldwell, in your Oct. 26 issue.

R. C. BARDWELL,
Vice-Pres. & Gen. Manager
Maddox Foundry & Machine Works,
Archer, Fla.

● No reprints were made but clippings are being sent.—Ed.

TIME STUDY

Sir:

Six reprints of your Aug. 17, Sept. 28 and Oct. 19 series on time study will be greatly appreciated.

A. A. GYOKER, 1st Lt.,
Ordnance Dept.
Watertown Arsenal,
Watertown 72, Mass.

EXPORT PACKAGING

Sir:

Your Sept. 21 article, "Packaging for Postwar Export" struck me right where I am interested. If reprints are available, I would appreciate a copy.

STERLING O. KIMBALL,
Process Engineering Dept.
AC Spark Plug Division,
General Motors Corp.,
Flint, Mich.

● No reprints were made, but a clipping is being sent you.—Ed.

REFRACTORIES BOOK

Sir:

Have the articles on refractories, by J. H. Chesters, which have been published in THE IRON AGE at intervals for the past several years, been compiled in book form?

MISS LUCILLE JACKSON,
Librarian
Vanadium Corporation of America,
Bridgeville, Pa.

● Yes. A book is being published in Eng. land. Write to J. H. Chesters, United Steel Companies, Ltd., Stocksbridge, nr. Sheffield, England.—Ed.

LAY READER

Sir:

From time to time the *Newark Evening News* enters bits of interesting items taken from THE IRON AGE. I have enjoyed these items and find them quite instructive. Is this magazine open to the layman on subscription?

R. M. CLARK

P. O. Box 73,
Hasbrouck Heights, N. J.

● Even in normal times The Iron Age confines its circulation largely to the industry it serves. Now, with our paper allowance only 75 per cent of what it was in the base year of 1942 and with requirements of our industry at an unprecedented height, subscription entrance requirements are necessarily stricter than ever.—Ed.

RUBBER DIES

Sir:

You have had many articles with reference to rubber dies for blanking and forming metal. Could you tell us where we could get the special rubber used in manufacturing this type of die?

D. BERLIN

Dennis-Mitchell Industries,
1819 E. Venango Street,
Philadelphia 34

● The dies themselves are not rubber but are steel or other metals as well as Masonite. The pad is rubber. Pads may be obtained from B. F. Goodrich Co., Akron, Ohio; Goodyear Tire & Rubber Co., Akron, Ohio; U. S. Rubber Co., 1232 Sixth Ave., New York 20, or some of the other rubber companies. For latest information on the subject see "Designing Rubber Press Tools," page 50 of the Sept. 14 issue, page 58 of the Sept. 21 issue.—Ed.

STEEL FORGED CASTINGS

Sir:

Is any company in the United States successfully using a new process of making steel products in metal molds? That is, casting molten steel into metal molds or dies and directly thereafter applying pressure upon the metal as it solidifies to forge the casting as it shrinks in order to prevent the development of cracks and fractures.

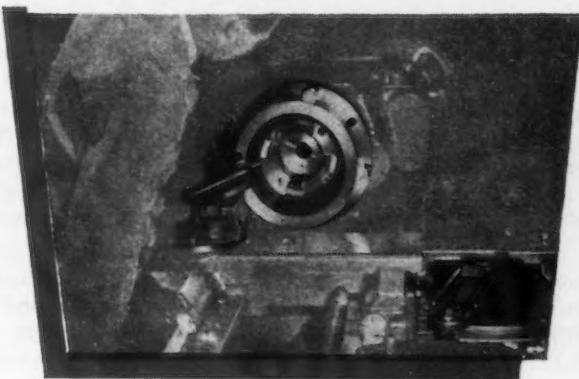
CATHERINE ANNE PEARCE,
Librarian
Canadian Car & Foundry Co., Ltd.,
681 W. Craig St.,
Montreal

● Experimental work has been done in several plants, but as far as we know, the practice has not approached the commercial stage.—Ed.

Turn tapers the modern way...on

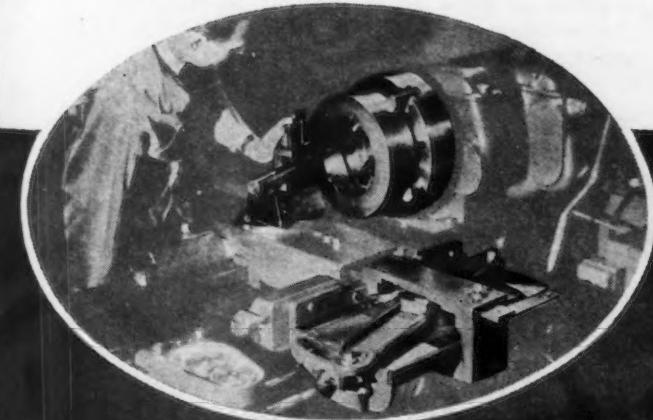


Extremely acute angles can be turned accurately with the Monarch Taper Attachment Variator. Illustration shows turning 60° included angle.



Acute angle boring from small end of taper is shown here. Ordinarily a difficult job, extremely acute angles can be bored to close tolerance limits with Monarch Taper Attachment Variator.

For steep angle boring, as illustrated, the Taper Attachment Variator can bore (or turn) up to 90° included angle.



Acute angle turning or boring, steep angle boring, form turning and boring and similar work reaches a new "high" in accuracy and speed on Monarch Lathes with Anti-friction Bearing Taper Attachments and Variators. Working from a thin metal template, the shape is transmitted with extreme accuracy to large or small parts.

Far heavier cuts may be taken than with the conventional gib type of taper attachment, yet the tool is guided so smoothly and rigidly that even deep cuts can be made accurately when turning or boring acute angles. The Variator permits turning and boring up to 90° or more included angle... and it can also be used as a pantographing device to produce work which is smaller or larger than the template.

Many other examples of taper turning are included in our new bulletin, "Modern Taper Turning," (No. 1955A) which will be sent upon request. Any of our branch offices or representatives will supply additional details.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

DIRECT FACTORY BRANCHES

622 W. Washington Blvd., Chicago 6, Ill. • 801 Fisher Bldg., Detroit 2, Mich.
635 Industrial Office Bldg., Newark 2, N. J. • 10465 Carnegie Ave., Cleveland 6, Ohio
512 Empire Bldg., Pittsburgh 22, Pa. • Representatives in Principal Cities

Monarch Saves Time

Form turning a piece four feet in length is done from a metal template which is only one foot long. Notice the many tapers and diameters, all of which are imparted to the work with close accuracy.



This Industrial Week . . .

- 1945 Steel Pattern Emerging
- Plate Output Pressure Dwindles
- Sheet Production Staging Comeback

SWEPT by the tide of orders placed and commitments made in the past two weeks, the early 1945 steel production pattern has been clarified. Steel makers this week are in possession of production probabilities which leave them somewhat less in a quandary than was the case a few weeks ago. Furthermore, grounds for more optimism on an orderly reconversion period are found in the statement by Hiland Batcheller, WPB chief of operations, who in New York this week pledged that the WPB would soon give to all industry, in advance, the blueprint of streamlined regulations which would become effective when Germany is defeated.

While some districts are further behind on reconversion plans than others, the future action promised by the WPB operations head will be conducive to more concrete planning. Contrary to reports from other centers, many civilian industries in the Chicago district have made definite commitments as to the type and quantities of material they will require as soon as restrictions are taken off production. At least one steel company is encouraging such firm orders by means of fully processing them within its own organization and placing them in shape so as to be immediately entered upon mill schedule when the go-ahead signal is given.

Barring unexpected developments in the European war, shell steel will replace plates as the controlling factor in the steel product mix. Plate directives are expected to be cut further as maritime demand continues to drop. Recent reports indicate that the Maritime Commission's steel needs for the first quarter of 1945 will be roughly about one-half of what they are for the fourth quarter of this year.

WITH fewer plate commitments to fill, the steel industry will be in a better position to dig into the mass of sheet orders which have drifted high on mill order books in recent weeks despite substantial cancellations. The easing in the lighter gages of flat rolled items may mean that heavier production of galvanized sheets—long a market thorn—and tin plate can be undertaken.

This continuing influx of structural and carbon bar orders—particularly in the larger sizes—now clearly indicates that more extended deliveries on these products will become general. The conflict with shell steel for these items on the finishing mills will be an added hurdle. Structural steel capacity to the tune of a few hundred thousand tons to be released by the decline in Maritime needs in the first quarter of 1945 will probably be completely absorbed by Navy requirements.

The Office of Defense Transportation has asked the War Production Board to give the railroads 2,400,000 tons of their requested 2,900,000 tons for the 1945 rail program, of which 600,000 tons is asked for in the first quarter. With a cut of nearly 20 per

cent from the requested railroad requirements placed before it, it is difficult to see how WPB can shave this request much further, particularly in view of the fact that the 1944 ODT rail request was slashed. Nevertheless, the rail program will also be in direct competition with shell steel and structurals and if further pressure is exerted, it may feel the axe.

WAREHOUSES are again building up inventories with WPB's blessing, one major warehouse interest currently being in the market for about 20,000 tons of various products. Steel mills admit the probability that when the flood of civilian orders is released they will not be in a position to offer rapid delivery on small requirements, which if true, will place a heavy burden upon warehouses.

Almost alone among consumers holding allotments, the farm implement industry is outstanding in its willingness to make commitments beyond the first quarter. Because of manpower delays in production schedules, this industry in many cases finds its inventories climbing, with some makers showing signs of trouble in holding stocks to 60-day requirements.

Cancellations within the past several weeks have been an important factor in the steel market with one mill piling up as much as 500,000 tons in that category. Most of this was spread out for delivery well into 1945. Termination of such business is proceeding in good order with at least 75 per cent of the terminated contracts either settled or applied to other orders.

The only major war production program which will get strong emphasis in the future is the heavy artillery shell requirement. Three large shell producers are yet to come into production, while other shell manufacturers are currently getting under way.

The trend in scrap prices this week appeared to be definitely upward, but the magnitude of this movement is still to be determined. Heavy melting steel and associated grades are higher at Pittsburgh. Increases occurred at other centers also. THE IRON AGE scrap composite price is up 16c. a gross ton this week to \$16.08 a gross ton.

National steel ingot production fell half a point this week to 95.5 per cent of capacity. Only in Pittsburgh and Cincinnati were there evidences of increased operations with Pittsburgh output up two points to 95 per cent and the Cincinnati rate up four to 104 per cent. Declines occurred in the following districts: Chicago, down one and a half to 99.5 per cent; Youngstown, down two to 93; Cleveland, down 10½ to 90; Wheeling, down one to 92; the West, down six and a half to 93.5 and the East, down 10½ to 85 per cent. Philadelphia at 96; Buffalo at 104.5; Birmingham at 94; Detroit at 100.5, and St. Louis at 92.5 continued unchanged.

• **SCRAP STRONG**—The long expected rise in prices of iron and steel scrap seems to have begun in widely scattered districts. Most districts report increases in open hearth prices which in some instances exceed \$1 per ton. The rise in open hearth scrap prices has also encouraged increases in the price of turnings and borings in two districts. The only drop in scrap prices throughout the country is in Philadelphia, where blast furnace grades have dropped. There are reports of tentative inquiries from the mills indicating that the present trend may be further extended next week.

• **U. S. STEEL SHIPMENTS**—Shipments of finished steel products by subsidiary companies of U. S. Steel Corp. for the first ten months of 1944 were the highest on record. Shipments for October 1944 were 1,774,969 net tons. This compares with 1,733,602 net tons in September, an increase of 41,367 net tons, and with 1,794,968 net tons in October 1943, a decrease of 19,999 net tons. For the year 1944 to date, shipments were 17,639,435 net tons compared with 16,864,612 net tons in the comparable period of 1943, an increase of 774,823 net tons.

• **COOPERATION BRINGS RELEASE**—Cooperation by management and labor in assuring maintenance of full production of vital war materials at the Cleveland Graphite Bronze Co., resulted in the formal return of the company's two plants after two months and three days of government operation. Released by Lt. Col. George D. Lynn, Cleveland Ordnance District, who assumed control of them for the War Department, consiliation of the issues involved in the discharge of Elmer Torok, a machinist employed by the company for 11 years, is still pending. Pending also is Torok's appeal for his reclassification to a draft status of 1-A.

• **KAISER ORE**—More than one million tons of high grade Utah iron ore have been contracted for by the Kaiser Co., Inc. for shipment 475 miles to its Fontana steel plant at the rate of 1500 tons a day as soon as loading, processing and shipping equipment is installed. The ore will be from the Excelsior deposit in the Iron Springs District, the same general region whence ore from the Geneva and Provo furnaces is obtained. The Utah Construction Co., one of the six companies originally associated with Kaiser, will install and operate the equipment. Tariff rate for shipment from Lund Utah to San Bernardino, Calif. via Union Pacific

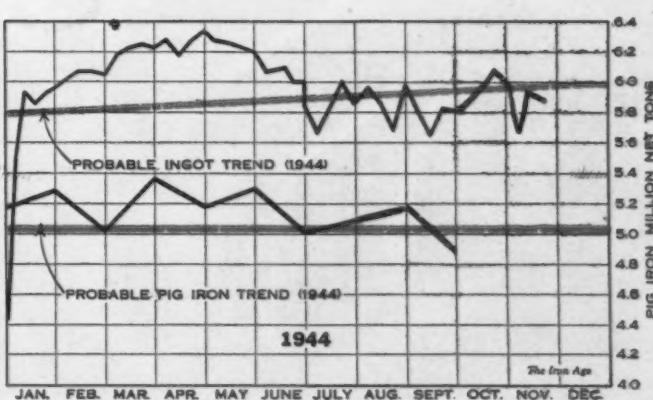
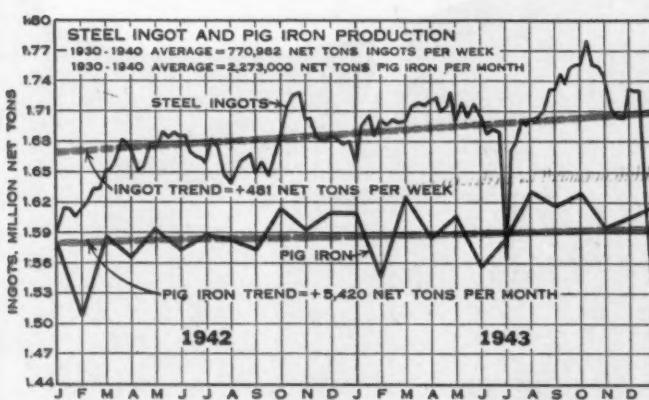
is \$4.10 per ton, with a slight additional charge to complete delivery at Fontana.

• **STEEL PAYROLLS**—September payroll was \$142,209,500. The August payroll was \$143,900,100. In September 1943 the payroll was \$143,768,900. The industry employed in September an average of 565,200 workers; 569,200 in August and in September 1943, 619,785. Wage-earning employees received an average of 121.0c per hr. in September; 116.9c per hr. in August and 116.0c in September 1943. Average work week was 47.2 hr. per week in September; 47.5 hr. in August and 45.3 hr. in September 1943.

• **OCTOBER STEEL PEAK**—As seems always to be the case steel production in October stepped up to the point where it was the highest since May of this year. Probably the main reason for October increases is to be found in the passing of vacations, hot weather and holidays. Open hearth steel output in October was at 97.5 per cent of capacity, compared with 95.6 per cent in September. Bessemer steel production in October was 81.6 per cent of capacity, compared with 80 per cent in September. Contrary to the general trend of percentage of operations figures, electric steel output while higher on a tonnage basis was 73.7 per cent of capacity in October, compared with 75.2 per cent in September. This decline was due to listing of new capacity in the past several months. Total steel output in October was 95.1 per cent of capacity, compared with 93.4 per cent in September.

• **CHEVROLET POSTWAR PLAN**—Chevrolet is figuring on meeting postwar demands by six-day week schedules, on as many shifts as may be necessary. The objective is to be able to produce 400 vehicles an hour. Three shifts, with lunch periods deducted, would make possible 22½ hr. of productive time daily. At the projected rate, this would result in 9000 completions, or 54,000 weekly. It becomes apparent that in a full year of approximately 300 working days, Chevrolet's potential would run around 2,700,000 cars and trucks. Of course 300 working days in any one year is unbelievably better than par for the course. But Chevrolet has a habit of breaking par on occasions, and certainly it can be conceded that the division will leave no stone unturned of the automotive parade. Capacity before the war was turned in its program of maintaining its position at the head close to 400 vehicles hourly, but that rate could not be sustained.

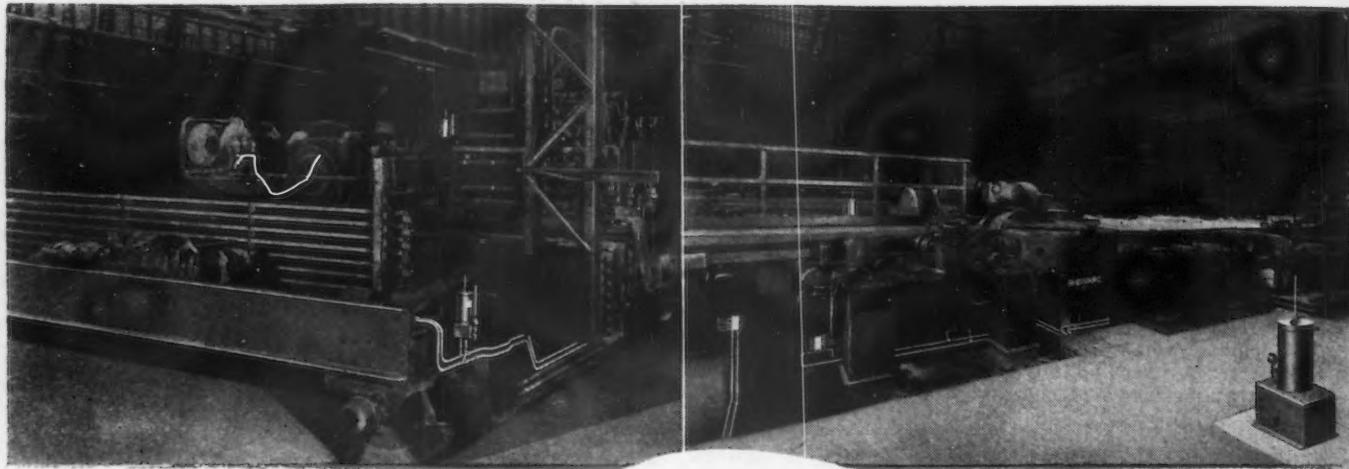
The Iron Age



Steel Ingot Production by Districts and Per Cent of Capacity

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|----------------|------------|---------|------------|--------------|-----------|---------|----------|-------|---------|--------|------------|-----------|------|-----------|
| November 6... | 93.0 | 101.0 | 95.0 | 96.0 | 100.5 | 104.5 | 93.0 | 94.0 | 100.5 | 100.0* | 100.0 | 92.5 | 95.5 | 96.0 |
| November 13... | 95.0 | 99.5 | 93.0 | 96.0 | 90.0 | 104.5 | 92.0 | 94.0 | 100.5 | 93.5 | 104.0 | 92.5 | 85.0 | 95.5 |

* Revised



Farval in the World's Largest Electric Steel Plant

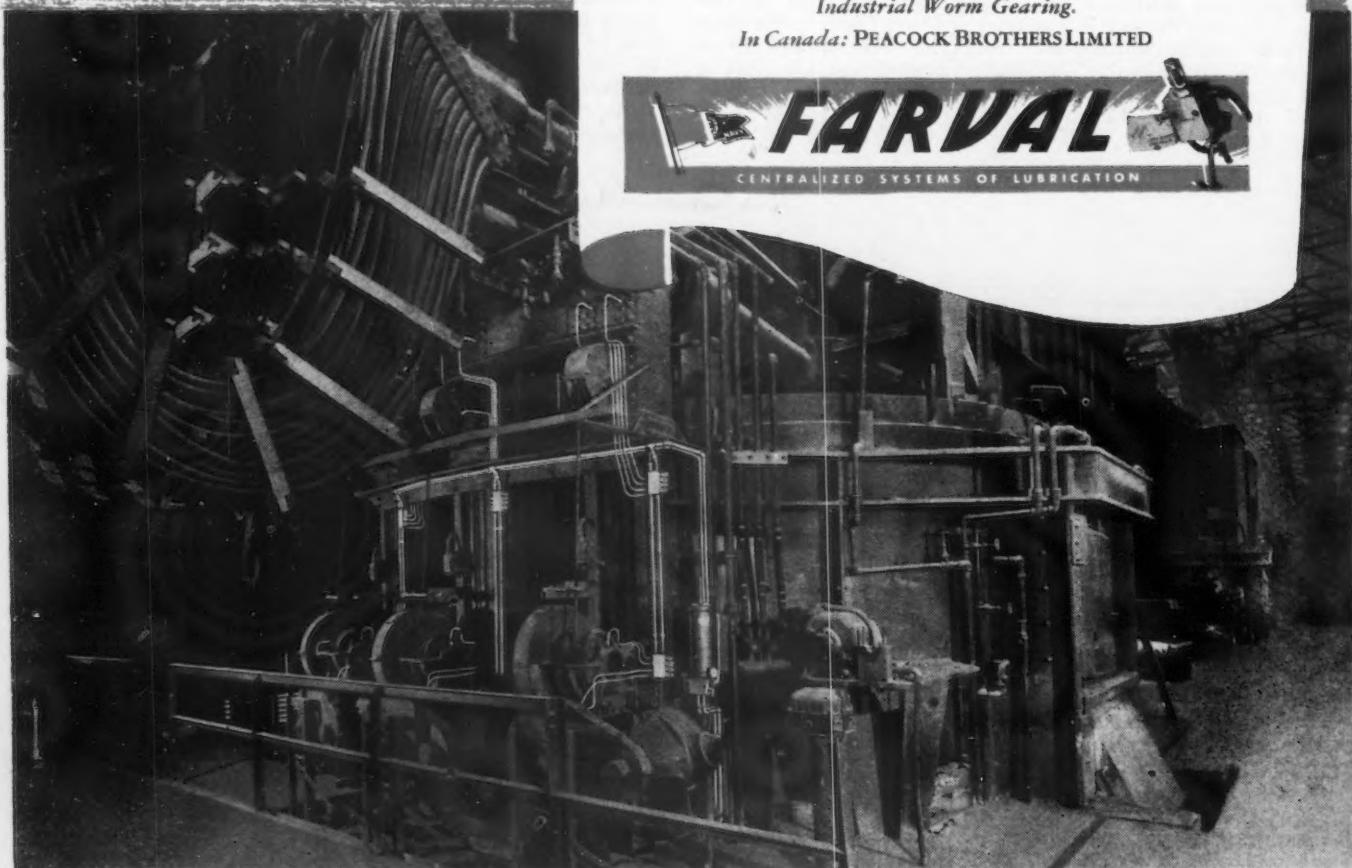
In this great new Unit—as in other modern projects throughout the Steel Industry—Farval Centralized Systems deliver positive lubrication to bearings on the Electric Furnaces, Tables, Gag Presses, Straighteners, Coke Pushers, Gas Cocks, Open Hearth Floor Charger, Pig Casting Machine, Blast Furnace Top and other vital equipment.

On your older equipment too, Farval can eliminate shutdowns—save bearings and increase output. Prepare for postwar competition—install Farval and you will reduce your costs now. Write for Farval Facts.

The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

*Affiliate of The Cleveland Worm & Gear Company,
Industrial Worm Gearing.*

In Canada: PEACOCK BROTHERS LIMITED



Maritime Steel Demand to Drop One-Half Soon

Washington

• • • After the first of next year, steel demand for the Maritime Commission will drop one-half because steel supply has been furnished shipyards in sufficient quantity to complete the Commission's 1945 program.

The Maritime Commission allotment of steel for the fourth quarter was 1,800,000 tons of carbon steel and 7200 tons of alloy steel. In the first quarter, the Commission will not receive allotments for more than 690,000 tons of plates and 4300 tons of alloy steel. An additional 30,000 tons of steel will be received for B products. Other products such as semi-finished, bars, pipe, etc., will account for another 200,000 tons of steel.

This means that more than 200,000 tons of structural steel capacity and 800,000 tons of strip mill capacity will be available for other than Maritime early next year. However, first quarter 1945 tentative allotments show that ODT, PAW and WFA will get a total of 174,000 tons more steel in that quarter than was received in this quarter.

With Army and Navy requirements approximately the same in the first quarter as in the fourth quarter, Maritime's zeal for steel supplies throughout the war, which resulted in its getting a six months' lead in steel supply, now causes an easing in the general steel situation which could have

Ed. note: The current maritime demand picture does not preclude a strong re-entry in 1945.

been reflected right along. The Commission plans to build nine combat cargo carriers, whose keels will be laid toward the first of the year but the steel requirements for these ships is reported to be only about 125,000 tons.

Maritime is now scheduled to receive 350,000 tons of plates in January, 150,000 tons in February and only 100,000 tons in March. Throughout the last half of this year shipments of plates have been more than 600,000 tons a month, approximately one half of the plate output of the industry. Appropriate reductions will be made of shipments of structurals and "A" and "B" products.

The Commission is permitting its

By DON BROWNE . . .

• • •

contracts for such components as stokers, boilers and turbines to run out in this quarter, so that deliveries of these items will be a mere dribble in 1945.

The Commission's yards made a considerable number of cancellations in the fourth quarter and right now it has crews out inspecting inventories with a view to balancing inventories in individual yards so that excessive inventories will not financially embarrass them in the event of contract terminations. This inventory check is expected to result in further cancellations in the first quarter.

The greatest part of the reduction in plate output will be borne by the continuous strip mills and it is expected that the increase of 122,000 tons for the WFA will come off of these mills. WPB and WFA expect to liberalize the provisions of the can order M-81 to permit the use of black-plate to pack articles which the order forced packers to put up in fibre

board and paper and glass containers. Motor oil and popcorn are examples.

While freeing structural capacity may result in relaxation of WPB restrictions on private home construction, there is no definite indication that this will be done before X-Day. Similarly, the capacity of the strip mills will be available to augment the small supply of steel reserved for spot authorization. However, OCR's request for steel in the first quarter is only up about 20,000 tons.

WPB, however, will not permit any of the excess capacity to be used for programming civilian production. The capacity will be equally available to all industries which are going to reconvert, should X-Day come in the first quarter. On the other hand, FEA is going to be turned down on about 200,000 tons of steel it requested for increasing exports to South America.

Lend-lease steel shipments to the United Kingdom have been suspended as of the end of November resulting in the cancellation of orders for about 60,000 tons of finished steel for that destination. One immediate result of this cut will be the closing down of five open hearths.

KINDRED INTERESTS: Being so busy with their own war production Americans are always interested to find others with the same headaches and successes. Here is John H. Van Deventer, president and editorial director of THE IRON AGE comparing notes with Rt. Hon. Oliver Lyttleton, minister of production for Great Britain at a recent luncheon in London.



Contract Cancellations Affect Mills and Subcontractors

Pittsburgh

• • • Program cancellations as announced by procurement agencies tell only part of the cutback story. Cancellations are taking two forms. First, there are the cancellations of major contracts such as the recent landing mat and submarine programs, where the cancellations are distinguishable through the entire setup back to the mills that make the raw materials. The other type of cancellations are those of sub-contractors who have been given work to do that is continuous and repetitious with no limit to the volume produced until such time as the entire program is cut back, and also the further fabricators of raw materials such as fabricators, cold drawers, etc.

In the first instance, terminations of contracts have been quite substantial and are directly reflected by the procurement agencies in their outstanding business, but the latter is less obvious but none the less important.

The cancellation of the major program, such as the landing mat program, is directly reflected in the manufacturers operations and in the production of materials that go into these items, but there has been considerable cancelling of business with the steel producers for the purpose of balancing out production that goes into major programs and for balancing inventories.

One steel producer alone during September had about 500,000 tons of steel cancelled that was on order. While this tonnage is spread out over many months' production and will only mean the bettering of the company's position as regards backlog, a considerable percentage was for the purpose of balancing inventories and production schedules and is not traceable to any particular program. Thus, it is seen that program cancellations tell only part of the story when it comes to cancellations of orders in the raw materials producers plants.

The one big drawback in the sheet picture is the manpower situation. The heavy tonnages of plates that have been forthcoming have been possible only because of the fact that the number of operations in plate production have been small, consisting mainly of rolling, shearing and shipping.

Sheets present another problem entirely. They are, in the main, not of the roll, shear, and ship classification, but require further operations such as annealing, pickling, normalizing, and other such processing. This places a heavy load on the manpower, which is very much restricted.

Furthermore, the actual processing time is greatly extended over that of plates. Consequently, sheet tonnages being produced are not what they seem. All mills here report that cold reduced sheets are a very tight item, traceable directly to the lack of manpower.

This situation has no obvious answer at the present time. Experienced help for such jobs is not available and will not be available until such time as releases from the services ease the manpower picture as a whole. This could and perhaps may be one of the big hindrances to full reconversion of the automobile and other industries relying mainly on sheets.

Plate Tightness Shifts To Sheets

Pittsburgh

• • • The recent and expected future cutbacks in plate production for the Maritime Commission and possibly for the Navy have been offset completely by the pickup in demand for sheets.

Sheets have been extremely difficult to obtain for the past two years because of plate demand, but currently the continuous mills are turning more of their attention to the rolling of sheets.

HAND LABOR: Chinese workers pull a stone roller over a new strip being built for the Air Transport Command of the U.S. Army Air Forces at Hsintsin.



Container Makers Get WPB Clearance On Unrated Orders

Washington

• • • Revoking L-332, General Industry Equipment, WPB has announced that manufacturers of machinery for making containers will be permitted to accept unrated orders and make delivery on such orders. The qualifying provision is that acceptance of unrated orders must not interfere with delivery of rated orders on hand. The removal of the rating floor is not expected to result in any substantial increase in the present backlog of unfilled orders, WPB officials said, since manufacturers of container machinery are now accepting unrated orders through the operation of Priorities Regulation 24.

Container machinery includes such items as bag-making machinery; metal can and drum-making machinery; paper can, tube, box and carton-making machinery; cap and crown-making machinery; screw-capping machinery; and can, jar and bottle-capping machinery.

Clayton Report Indicates Big Bargain Sales on War Plants

Washington

• • • While some undoubtedly will be retained by the Army and Navy in stand-by condition, the report of Surplus War Property Administrator W. L. Clayton to War Mobilization Director James F. Byrnes indicates that Government-owned industrial plants will be put on the block at bargain basement prices. Built under wartime conditions at high costs and often without regard to the most suitable geographical location, many of the 1146 plants which Mr. Clayton said the Government owns will likely be white elephants that may not be marketable at any price. Others under the price policy announced by the Surplus War Property Administrator will go at prices that are much below the original costs.

Coming nearer to the original cost, yet considerably below it, will be the realization on the several hundred "scrambled construction facilities" owned by the Government in addition to the individual plants. Included in the scrambled facilities are steel units built at existing plants. At the time the report was submitted only 17 plants were for sale.

That the plants will be sold at sharply knocked-down prices is seen from the terms of sale set forth by Mr. Clayton. The price, he pointed out, has been determined on what would be today's reproduction cost of the plant—and here is the big discount—"eliminating such war-time factors as overtime, delays in holding labor while waiting for materials and excess cost of laying foundations during the winter, as distinguished from the more normal methods of construction." This, it was explained, gives the present material and labor cost under normal methods. But another bite is taken out of the cost price. Depreciation is next deducted, then there is deducted the cost of whatever changes are necessary in the plant to make it suitable for peacetime operation.

The report also optimistically suggests the idea which is under study of converting some of the larger plants into multiple tenancy of small unit manufacturing but pulls a rug under the suggestion. It says such multiple tenancy operations have been usually successful both in this country and in England where transportation was good and where they were

adjacent to large consumer markets. Then the rug is jerked.

"Most Government-owned plants are not so located," said the report.

The armed services are completing internal surveys to determine what plants should be retained in stand-by condition, what plants are needed as war reserve and what machine tools and production equipment will be needed for such programs as the modernization of arsenals and the like.

DPC has completed over 95 per cent of detailed surveys of each plant to be sold or leased. It is also making cost comparisons both in con-

struction and operation between different plants in given fields and between different products that are competitive or potentially so.

In addition to its recently distributed briefalogue listing industrial plants and sites, DPC is preparing brochures of plants for distribution through the field offices to prospective purchasers or users when the plants are surplus. Also all present lessees of DPC-owned plants have been contacted for an expression of whether they are interested in purchasing or leasing the plants and where such interest is indicated, present negotiations are being suggested in order to avoid a period of idleness between the termination of hostilities and the operation of the plant for postwar purposes.

FEA Organizes to Handle Large Overseas War Surplus Disposal

Washington

• • • The FEA expects to organize internally in time to handle the large war surpluses after V-E Day and on Oct. 12 issued an Administrative memorandum assigning responsibility for surplus disposal to its Bureau of Supplies.

In announcing FEA's plan, the recent report of Surplus War Property Administrator W. L. Clayton said that the basic policies set forth in the instructions for overseas disposal of surplus property include the following:

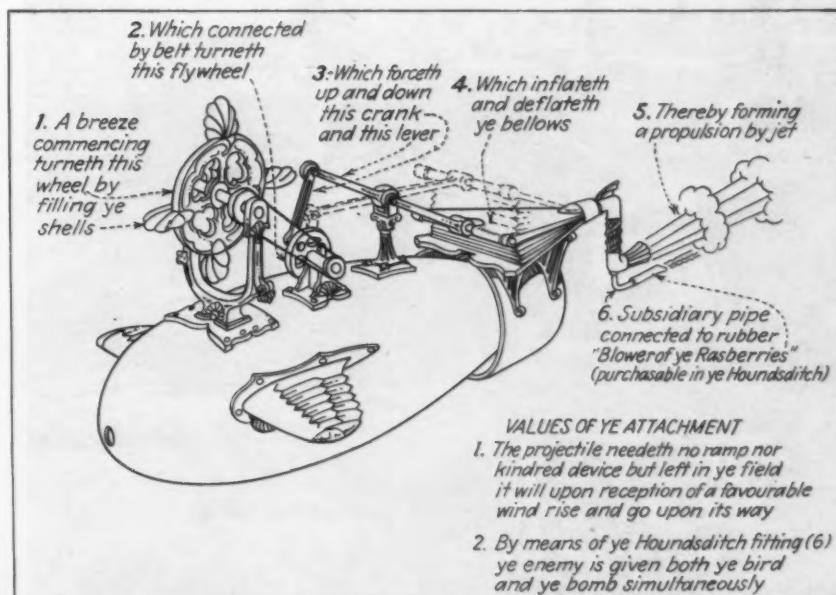
United States Government agencies shall have priority in right to pur-

chase surplus property at fair market value.

Thereafter, surplus property located abroad shall be made available for relief and rehabilitation purposes, provided that the price at which the goods are sold or transferred to the relief organization is equal to the net realization expected to be obtained for similar goods sold through commercial channels or on the open market.

In other sales, the original United States manufacturer or his authorized representative abroad will receive preference, in case of equal prices and terms.

Every effort shall be made to main-



tain the customary channels of trade and wherever private exporters or private commercial houses abroad can handle surplus war property in accordance with the overall policy, arrangements shall be made for them to do so.

The foreign disposal agency shall make arrangements with foreign trade and exporters' associations in the United States for regular and continuing contact and exchange of advice and suggestions, using industry committees or similar method of contact.

The foreign disposal agency, in order to discourage the return of sur-

plus goods to the United States, shall make sales to buyers abroad who will use the goods in their own business over-seas, or whose normal or probable outlets will be outside of the United States.

Overseas disposition shall be for cash United States dollars unless other terms are expressly authorized from Washington.

Where it is impossible to arrange with foreign governments to assume under reciprocal aid approved claims or unpaid obligations of the United States, surplus property may be used to settle such claims, where a net benefit to the United States can be so obtained.

tends from the mining of raw materials through all the processes to the finished products and that they could "design and operate a complete steel mill."

Mr. Nelson said that he knew Chinese managers and workers would have the greatest respect "for these American production men, who, among them, can do virtually any job in iron and steel production."

Adjustments Made In Steel Composite Price

New York

• • • The 1944 IRON AGE finished steel composite price has been revised to a quarterly basis, making the index for the first quarter 2.27235c. a lb.; for the second quarter 2.30329c. a lb., and for the third 2.30837c. a lb. The estimated index for the fourth quarter, based on shipments during the previous period and on unchanged price levels, is 2.30837c. a lb.

This weighted index is composed of 10 classifications: Hot rolled bars, structural shapes, plates, wire rods, heavy rails, black pipe, including butt weld, lap weld, electric weld, seamless and conduit, and hot and cold rolled sheets and strip. In calculating the

See index on page 172.

finished steel composite price, the percentage of each component to the total tonnage of the 10 items sold in each quarter is multiplied by the prevailing price. The final sum is THE IRON AGE finished steel price index.

The index in this form was first published in Aug. 28, 1941, issue, and for the years 1929-40 was based on shipments for the 10-year period 1929-39. The index for the years 1941, 1942 and 1943 because war production emphasis on products like plates were based on shipments for the one year involved. Starting with this issue, the composite price will be based on quarterly shipments.

Koppers Awarded Coke Oven Contract for C-I Clairton Works

Clairton, Pa.

• • • The Carnegie-Illinois Steel Corp. has awarded a contract to Koppers Co., for the construction of 174 Koppers-Becker underjet type coke ovens, consisting of two batteries of 87 ovens each at its Clairton plant.

The new ovens, which replace batteries Nos. 21 and 22, will have a normal coking capacity of 4,860 tons a day.

Nelson Names Steel Men To Assist in Getting Up Chinese WPB

Washington

• • • "Hand-picked," he said, for their long practical experience in iron and steel production, Donald M. Nelson, former WPB chairman, has announced the names of the five iron and steel experts who will accompany him on his next trip to China to set up a WPB to increase Chinese industrial production with emphasis on steel output.

The steel group will be headed by Herbert W. Graham, director of metallurgy and research, Jones & Laughlin

Steel Corp. Others in the group are: E. K. Waldschmidt, chief of the shell steel section, WPB Steel Division and formerly with Jones & Laughlin Steel Corp.; Carl Albert Bell, foundry superintendent, United Engineering & Foundry Co., New Castle, Pa.; Henrik Ovesen, consulting engineer, Lukens Steel Co., Coatesville, Pa.; Harry A. Strain, director of raw materials, fuel and tar, United States Steel Corp., Pittsburgh.

Speaking of the steel experts, Mr. Nelson said that their knowledge ex-

PURE WATER: Immediately after Leyte became comparatively free from enemy resistance, an engineer purification unit was set up due to the possibility of polluted drinking water found on the island.



Clayton Discusses Machine Tool Market Threat of 500,000 Units

Washington

• • • In a report to War Mobilization Director James F. Byrnes on Nov. 8, Surplus War Property Administrator W. L. Clayton said that at the present time the government alone owns between 500,000 and 600,000 machine tools, a very large proportion of which will eventually become surplus. Since this represents over 25 years' normal prewar production of the machine tool industry, he pointed out, and since that industry has itself greatly expanded during the war, the scope and importance of the disposal program are obvious. When the war in Europe began, Mr. Clayton said, there were approximately 900,000 machine tools in the United States.

Relatively few machine tools have yet been declared surplus. On Aug. 22, 5287 had been declared surplus and 4485 disposed of in over 3000 individual transactions, leaving 802 on hand. The great bulk of these were owned by DPC, which in this instance is a substantial owning agency as well as being the disposal agency.

Specific negotiations for the sale to the British government of lend-lease machine tools located in England are under way, said Mr. Clayton, who will retire as soon as President Roosevelt sets up a Surplus Property Board, successor to SWPA.

Mr. Clayton outlined a plan presented to SWPA by a committee of the interested agencies for the disposal of surplus cutting tools. Subject to the approval of the Attorney General the plan has been approved by the administration and by the Office of Contract Settlement. Similar plans have been considered for such products as abrasive wheels, ball and roller bearings, and others, including communications equipment.

Dealing with steel and other common metals, Mr. Clayton said that these are handled under a recently devised procedure by the Metals Reserve Co., involving local sales coupled with a plan for nation-wide information and shifting of stocks from one area to another. Two difficulties were said to have been encountered in the disposal of surplus metals—first, the natural desire of purchasers to acquire necessary supplies from their regular sources, and second, the unbalanced supply and demand in various localities.

The first of these difficulties, it was

pointed out, has been accentuated by the limitations upon uses necessary under wartime conditions and particularly because of manpower shortages. Because of these conditions, the report said, in many cases the only persons allowed to purchase are also allowed to fill their requirements from prime sources. Since in most cases material is available from prime sources at the present time and since there is relatively little profit incentive because of taxes and renegotiation, it was said, the allowable purchasers are not anxious to acquire the surplus material regardless of price. As a result, the report stated, in many cases the only buying interest has been from dealers, who are primarily interested in purchasing on a relatively long term speculative basis rather than to fill immediate requirements. Mr. Clayton said that it has seemed inadvisable to break the market to a level attractive to such

speculative buyers, since with the relaxing of limitations which may be expected in the not too distant future, a market will exist which will return to the government a far greater value than would be available by sales today.

The geographic dislocation which presented a considerable obstacle to sales, it was said, is being overcome by a procedure which establishes a central inventory with an agent in New York, who performs two functions, bringing together inquiries from one locality and supply at another, and buyers to whom nationwide offerings are of local interest.

On the recommendation of the Scrap Metal Division two major changes relating to sales of scrap have been made in the Administration's price policies for the sale of contract inventories. The scrap warranty, originally required to be obtained from all persons buying at scrap prices, has been made optional with the owning agency in sales on competitive bids and remains only in negotiated sales.

Steel Producers May Replenish Mill Stock

Washington

• • • With the provision that title has not been transferred to a consumer or a warehouse, WPB has issued a direction to CMP Regulation No. 1 permitting a producer who previously maintained a mill stock of steel products at any location to con-

tinute to maintain it at such location.

The direction said that a shipment made by a producer from mill stock may be replaced from mill rollings provided the replacement is made of the product shipped.

The direction does not apply to producer-owned stocks held on consignment by a distributor as defined in CMP Regulation No. 4.

FOR SALE: These scout cars at Lordstown Ordnance depot, Warren, Ohio, have been declared surplus by the Army and have been offered for sale. Later models have been issued to troops, who used these cars for training.



Canadian Machine Plan

Surplus Disposal Plan Operating

... by W. A. LLOYD ...

Cleveland

• • • Reports of Canada's solution for machine tool surplus disposal through regular manufacturing channels have echoed pleasantly through the heads of some machine tool makers here.

Alert for V-E Day's starting gun, here's what the Canadians have done: A survey has been made of secondary industry to determine its postwar needs and this survey is being used as a basis for surplus disposal. Manufacturers who have been using worn equipment will be offered government machines at reduced prices.

Old equipment will be accepted as part payment on these "Crown machines" (government-owned), and the balance will be financed through the newly formed industrial bank. However, Canada's estimated surplus of 35,000 machine tools hardly poses the problem of the surfeit on this side of the border.

This plan might have possibilities in the United States, even with a vastly more complicated situation involving disposal of more than 600,000 machine tools, which if warehoused by the government, listed with serial numbers, age, location, and supplementary equipment, would provide our machine tool industry with employment for sales staffs (who know where the equipment can be sold), replacement of the "jalopies" or worn-out machines, thus raising industry's efficiency and offer machine tool people shop work in putting these machines back in first class condition.

Canada has kept its surplus down by a machine tool pool, which has worked for the benefit of all concerned. There, as soon as a machine is idle it is reported by the government officer in charge, returned to the pool, or sent somewhere else to be put to immediate use. However, the original user can get a replacement as soon as new contracts require it. Here, some plants are reluctant to list idle machines for fear of losing them to another plant and facing the delay involved when new contracts come for which the machines are needed.

Various branches of the armed forces, having machines under contract, are sometimes hesitant to release them to each other in anticipation of new emergency urgent requirements. Machines are also idle through manpower shortages, stated or actual.

Others have evaluated Canada's surplus disposal plan as splendid for them but extremely difficult for us. Canada has a limited number of plants to put them in, while we have several hundred thousand, which makes the problem even more complex. The Canadians will probably take care of all metal-working plants out of their pool and still have a lot left over. Naturally it would be more desirable here to have manufacturers trade in or dispose of 15-year-old equipment.

Use of original channels for surplus disposal has been discussed in this country, and it is being done right now with milling cutters. There is, however, some legal question in-

volved with the government strangely recognizing a quasi-monopoly. Legislation might be required to implement this completely and at present it will have to be on a voluntary basis when Germany finally collapses.

Assuming the war ends in 1946, in 10 years most of the war machines will have 15 years' service on them and in the interval, machine tool builders will be confronted with several things: building new machines for people who can't find what they want on the surplus list; clean, re-fit, and inspect a lot of war surplus equipment; and sell to the Russians, who want new machines and want them practically at once.

Some orderly system will have to be worked out as to who comes first, but making new machines and thereby providing employment during the postwar period would seem to be more important than surplus disposal.

It has been suggested that the surplus be made immediately available at a low price to anybody, with no effort to route it through the regular channels. But if surplus disposal is placed at the top of the list, industry will have to wait until publicly-owned institutions take their pick, then the returning veterans will take theirs and then offer the rest to the public—in all, a slow and tedious procedure.

Redistribution through original channels has been tried with milling cutters, with the manufacturer undertaking to purchase them from the government as and when he can sell them, with new and refurbished cutters at no set ratio. His is the problem of getting them, seeing that they're in shape, sharpening if necessary, and finding a market. Here again, as with machine tools, manufacturing sales staffs should have the best market notions.

In this same category, a machine tool executive here stated emphatically that no more standard machine tools should be made, and that he was confident there is enough inefficient equipment in use today, replacement of which would absorb the entire government surplus.

Russia will want our newest machines, and not the surplus, since they have had excellent results with American equipment and they feel, logically, that a good, new machine can outproduce one that is five or six years old; consequently, they want the newest and most profitable machines they can get.

The Russians seem to feel that we have something up our sleeves and want quotations on machines that

PORTRABLE HOME: War worker families can now take their homes with them when they want to move. The dwellings, developed by Goodyear Tire & Rubber Co., contain two bedrooms, combination living and dining room, kitchen and fully equipped bathroom, which sells for slightly under \$2000.



will be offered to the United States market two years from now. Obsessed with the manufacturing efficiency idea, which they got from us, the Russians may have better machines in their shops than we have, simply because our manufacturers seem reluctant to use up ready assets in the face of a questionable market. Russian planning, apparently on a pronounced capitalistic trend and the antithesis of our own, may prove a truly significant factor.

Rumor has it that the White House is considering the suggestion of several amendments to the surplus disposal act, but with the board still to be appointed, changes are a long way off. It is also reported that England, who will be a fierce postwar competitor, has been shipping some well-worn machine tools, American made, into the colonies, which will hardly make it pleasant for us later on. India, representing a fertile market, would like to buy a lot from us, but postwar tariffs will soon be popping up.

Here, the machine tool trend is completely reversing itself and March should see civilian orders stacking up against the military on a three-to-one ratio, representing a real turnaround.

Steel Payrolls Show Small September Drop

New York

• • • Payrolls in the steel industry decreased in September from the August levels, apparently because of the shorter month, according to a report released by the American Iron & Steel Institute. The average number of employees decreased also. Average earnings per hour increased, however.

The September payroll was \$142,209,500. The August payroll was \$143,900,100. In September, 1943, the payroll was \$143,768,900.

The industry employed in September an average of 565,200 workers, compared with an average of 569,200 in August. In September, 1943, the total number of employees was 619,785.

Wage-earning employees received an average of 121.0c. per hr. in September, compared with 116.9c. per hr. in August, and 116.0c. in September, 1943.

Wage earners worked an average of 47.2 hr. per week in September, compared with 47.5 hr. in August and 45.8 hr. per week in September, 1943.

Expansion of Continental Can Co. Presages New Postwar Strength

By JACK HIGHT

New York

• • • Continental Can Co., Inc., for the most part prewar manufacturers of metal containers exclusively, is developing into what may well be a typical postwar organization pattern. Business observers in many quarters are anticipating extensive mergers of a great many industries in the postwar period. Anti-trust laws now on the books will tend to discourage mergers within particular lines, encouraging the acquisitions of related lines, as Continental Can has been doing in the packaging field, and affording the advantage of a strong competitive position among other producers, while permitting development into new lines developed during the war.

Historic expansion for a firm such as Continental would be to purchase other manufacturers of metal containers, or merge with them. Instead, the company has gone into the bottle crown and cork field with the purchase of a strong organization in that category and has gone into the paper container field, one that has been but slightly competitive with the metal containers, but is developing more rapidly in non-competitive directions. Agreements with foreign firms for using the company-designed can making machinery are also expanding. In addition to acquisitions in these related fields the company has made a wartime start in the resin-plastic field, manufacturing laminated sheets impregnated with resin (Marcolite) for certain formed aircraft parts and the

more conventional plastics through the acquisition of one of the leading firms in the business.

Continental's principal development in the paper and fibre can field began in 1942 with acquisition of several established companies in this line. An entry into the cylindrical fibre container field was accomplished by the acquisition of the paper can facilities of the Utica plant of Fonda Container Co. and the business and assets of the Boothby Fiber Can Co. of Boston, both producing liquid-tight paper containers for the most part not competing with the metal field. Late in 1942, the company acquired all of the outstanding capital stock of The Container Company of Van Wert, Ohio, manufacturers of large fibre drums for chemicals and other products, also largely non-competitive with the company's products in the metal container field.

Development in the paper container field, predicated on the belief that huge postwar expansions will take place in the packaging field, not replacing metal containers in their established lines, but going into fields not commonly packaged before the war, has continued with further expansion this year. The Keystone Drum Co., manufacturer of fibre drums, with headquarters in Pittsburgh, and including four plants, was acquired this year, as well as the business of the Mono-Service Co., of Newark, N. J., original firm in the sanitary paper cup field. The fibre drum business was further expanded by the establishment

HASTY RETREAT: Two Allied soldiers inspect an abandoned 88mm. gun, which was left behind by the Germans in the Grandvillers Area, France. As usual the sighting equipment and breech-block are gone.



of an additional plant for the manufacture of this product at Reading, Pa.

Complementing the company's bottle crown division already established, the company purchased in January, 1944, the Bond Mfg. Co. of Wilmington, Del., the second largest producer in the field, now operated as a separate subsidiary under the name Bond Crown and Cork Co. The purchase followed several years during which Continental purchased the cork for its crown division from Bond and others. Today, Bond's sales staff and organization is utilized to handle the products of the old Continental crown division, as well as its own.

In addition to a prewar metal container business, Continental has always made much of its own can manufacturing machinery and certain machinery leased to its customers for closing metal containers, three machine shops being devoted to this work. The Cameron Can Machinery Co. was acquired this year to add to those three plants. They are, of course, all occupied today with war work, but will be needed in the post-war period to take care of the backlog of machinery needs unfulfilled during war years. These needs include not only the company's domestic requirements but also those of its licensees in foreign countries, who by the terms of the license are permitted to purchase equipment designed by the company.

Such agreements are in effect in Great Britain, Australia, South Africa, France, Belgium, Holland, Germany, Argentina and Brazil, although naturally those applying in enemy occupied countries have been suspended during the war. New agreements have recently been negotiated for Mexico and others are likely to follow in the near future for countries where considerable interest has already been shown in the development of modern can manufacturing methods.

Further strengthening in its own field of metal containers has been effected by the purchase by Continental of the assets of Owens-Illinois Can Co. effective November 1 of this year, and acquisition earlier this year of the MacDonald Mfg. Co. of Toronto, formerly a division of General Steel Wares, Ltd.

Moving outside the packaging field Continental Can has become interested in the development of certain plastics, particularly the development of resin impregnated fibre-glas cloth, suitable for forming into sheets. A financial interest was acquired in 1943 in the

Marco Chemicals, Inc., and in this way the company entered the field of synthetic resins, manufacturing aircraft parts of the type officially approved by the Army Air Forces. In an effort to acquire additional plastic experience, this year the Reynolds Molded Plastics of Cambridge, Ohio, has been added to the fold.

Reynolds, with years of experience in molding the more conventional plastics, widely used in the prewar trade, will be prepared to follow all

lines that the present plastic trend develops.

Of particular interest at this time are conjectures on consumer's goods uses for the laminated plastic formed sheets.

This continuing expansion places Continental Can Co. firmly in its pre-war field, and leaves it free in its other divisions for expansion in assured new markets, while recognizing the possibilities of markets not now clearly defined.

Committee Condemns Cartels; Government-to-Government Trade Urged

Washington

• • • Damning cartels as instruments which restrict trade, promote wars and prevent full employment the Kilgore (Senate) Committee on War Mobilization reported Nov. 13 that government-to-government agreements on foreign trade are the only roads to permanent international cooperation.

Casting aside the regulated or registered cartel as a subterfuge which would perpetuate the abuses of cartels, the Committee said it favored the continuation of private enterprise in the United States.

The Committee recommended that the "close collaboration" which existed between the United Nations during the war be continued in peace and said that the United States must extend credit to foreign nations to industrialize them and reconstruct war devastated areas. That collaboration to date has consisted in lend-lease, government buying and loans which the Committee says will not interfere with private enterprise.

The report said:

"Through the medium of their joint economic organization the nations should inventory their resources to see how they can most effectively exchange their special products so as to secure for each full production, full employment and a rising standard of living."

Trade barriers would be eliminated and the principle of reciprocal trade agreements should be expanded into multilateral national agreements providing for the free movement of goods, according to the report.

The Committee suggests that a joint legislative and executive commission should be created to assure effective intragovernmental cooperation. Representatives of industry, labor and agriculture would be in-

vited to "participate in the deliberations" of the commission so that the best proposals can be given thorough consideration.

Patents should be exchanged and royalties be provided foreign inventors on a reciprocal basis to prevent in future wars the repetition of restrictions on domestic production and interferences with national defense which the Committee alleges prewar cartels were responsible for.

Further, the report says that international agreements furthering the principle of the American antitrust laws should be formulated and the hand of the Department of Justice should be strengthened legislatively to prevent American companies in participating in cartel activities.

Secretary Henry Morgenthau's proposal that German industry be decentralized to prevent the rise of further Germanic war aims was supported by the Committee. The report said:

"A real disarmament program requires not only the dismantling of direct munitions industries, but also the dismantling and removal to the devastated areas of Europe of the primary indirect munitions industries, including the metallurgical and chemical industries."

The Committee also promises full employment while raising the American standard of living at least 50 per cent, and producing more than one-and-one-half times the highest prewar output, at the same time preserving free enterprise.

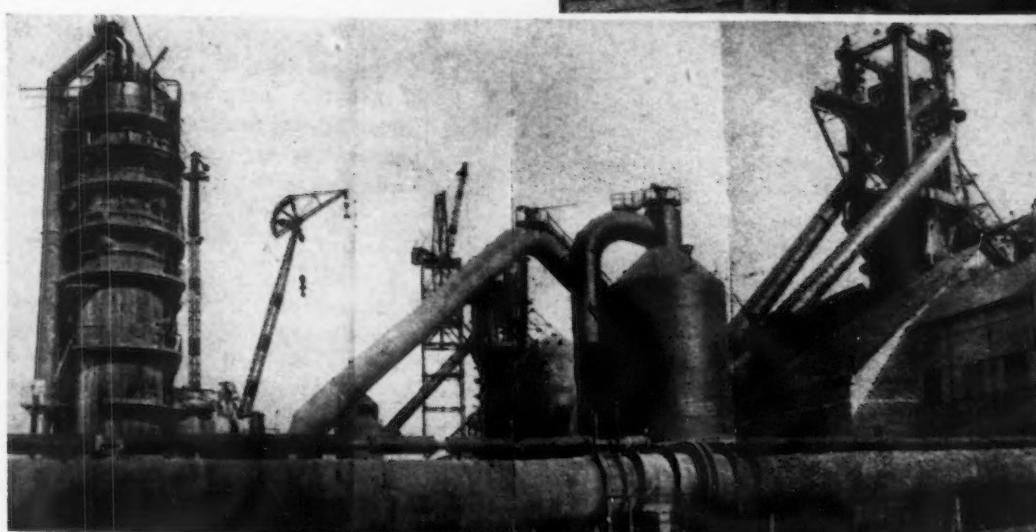
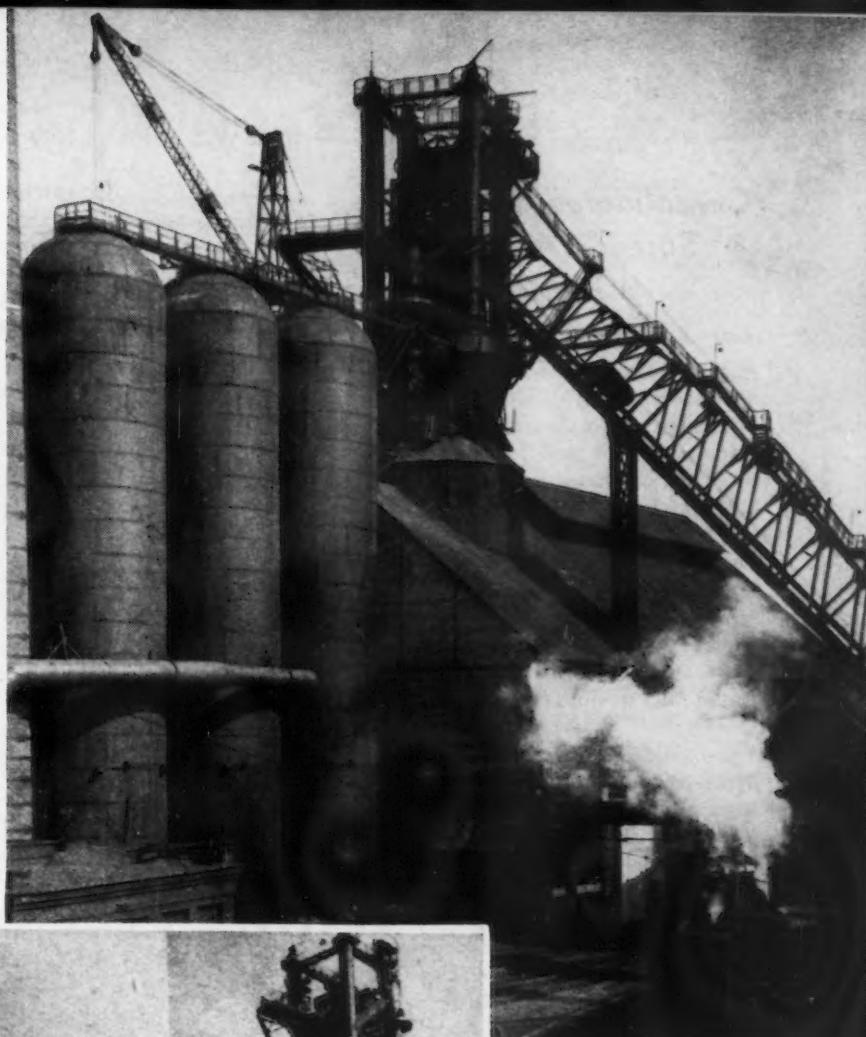
While speaking at length about lifting international trade barriers, the Committee says that "our great industrial production cannot be isolated within our national boundaries, nor can it be sent abroad on the basis of rivalry among nations without thoroughly jeopardizing the peace."

New Russian Furnaces

Exceed Capacity

• • • Kudos from Stalin himself are going to Russian steelworkers for their efforts in starting production in new blast furnaces. One new furnace is now in operation in the Chelyabinsk Iron and Steel Works, the first at that plant. Another at Nizni Tagil, known as No. 3, has also been blown in. Both these plants are in the Urals.

Built during the war during the course of several months, these new furnaces were producing at above rated capacity within a few weeks after being blown in. Planned capacity of the new furnace at Chelyabinsk is 300,000 tons of pig iron a year, while the No. 3 furnace at the Novo-Tagil Works is expected to produce 400,000 tons.



BLAST FURNACE THREE:
Producing at
above capacity,
its workers have
been cited by
Stalin.



CONSTRUC-
TION WORK-
ERS: Starting
without prior
knowledge in
steel construc-
tion, young men
gained official
praise for their
work in setting
up blast furnaces
in the Urals in
Russia.

Consolidated Steel Spreads Activity With New Purchase

Los Angeles

• • • Consolidated Steel Corp. has purchased controlling interest in Transmarine Navigation Corp., a terminal operator and maritime steamship and shipping agency in the Los Angeles-Long Beach area. Concurrently Kaiser Co. Inc. is reported to be negotiating with the U. S. Maritime Commission for six cargo ships which would be operated by a prospective Permanente Steamship Co. inter-coastal by way of the Panama Canal and from Los Angeles across the Pacific.

Consolidated Steel is the largest independent steel fabricator operating on the West Coast and since the beginning of the war has delivered more than 1000 vessels of various types including destroyers, destroyer escorts, frigates, attack transports, hospital ships, C-1 cargo and passenger vessels, coastal cargo vessels and several types of landing craft, from shipyards at Wilmington and Long Beach, Calif. and at Orange, Texas. President Alden Roach comments on the recent acquisition of Transmarine control as follows:

"We believe in the future importance of the Los Angeles-Long Beach harbor as a shipping center and as a foreign trade outlet for the increased postwar export of agricultural and manufactured products from the Pacific Southwest. We are proud to be identified further with the maritime industry in southern California."

Henry J. Kaiser's application has been submitted to the Maritime Commission in Washington for the purchase of six ships to be used in the proposed new service. Two vessels used by Kaiser before the war in con-

nnection with his cement business and now being operated by the War Shipping Administration would be traded in on new ships, four to be C-3 cargo ships and two Liberty tankers to be converted into bulk carriers of cement.

Prewar, both the United States Steel Corp. and Bethlehem Steel Co. operated merchant ships inter-coastal through subsidiary steamship companies. The simultaneous announcement by two independent West Coast steel operators who have extensively engaged in shipbuilding during the war period may indicate that hereafter steel inter-coastal shipments may not be so prevailingly one way as heretofore.

Bergen Departs From Crucible Steel Co. To Set Up Own Firm

New York

• • • Lewis S. Bergen, formerly Associate Director of Metallurgy and Research for Crucible Steel Co. of America, has left that organization as of Nov. 1 to become president of Bergen Precision Castings, Inc., newly organized company.

The new organization is located in Pleasantville, N. Y., and will be engaged in the scientific development of the relatively new art of precision casting of all types of metals, carbon, alloy and stainless type steels, monel, brass, zinc, and other non-ferrous metals and alloys. Work is also expected to be done in the newer alloys which are difficult or uneconomical to machine.

In the management of his new company Mr. Bergen will be assisted by John A. Foster, formerly ceramics engineer at the Ford Motor Co., who is known as one of the outstanding ex-

perts in the development of precision casting, and Richard C. Paret, who was also formerly connected with Crucible.

Before joining Crucible Steel in 1926 Mr. Bergen was with the Bethlehem organization for three years. He was graduated from Lehigh in 1925. In the metallurgical field he has been associated with the high temperature alloys and specialty carbon alloy, stainless and tool steels for the past 19 years.

Weirton Independent Union Case Suspended Because of WLB Move

Washington

• • • Processing of a dispute case involving the Weirton Steel Co., Weirton, W. Va., and the Weirton Independent Union, Inc., before the Fifth Regional WLB at Cleveland has been suspended by order of the National War Labor Board because the National Labor Relations Board filed a contempt petition in the Circuit Court of Appeals charging that the independent union is company dominated. The War Labor Board vote was 4 to 2, with industry members dissenting.

The dispute was certified to the WLB on June 3, 1944, and on June 22 the Board referred the dispute to the Fifth Regional Board for processing. The WLB was informed at that time that the National Labor Relations Board was contemplating bringing court proceedings against the coming because it continued to recognize the Weirton Independent Union, Inc., but the WLB refused to delay processing of the case, since the National Labor Relations Board had not taken any affirmative action in connection with this independent union.

However, since that time the National Labor Relations Board filed a petition in the Circuit Court of Appeals against the company on the grounds that the company had violated a previous court order directing the company to disestablish two unions which the National Labor Relations Board had held were company-dominated. The National Labor Relations Board in its court petition contended that the newly-formed Weirton Independent Union, Inc., was a reincarnation of the Weirton Steel Employees' Representation Plan and the Weirton Steel Employees' Security League.

COMING EVENTS

Nov. 10-18 — International Business Conference, Rye, N. Y.

Nov. 19 — Gulf Coast Chapter, Institute of Scrap Iron & Steel, Inc., annual fall meeting, Dallas, Tex.

Nov. 27-Dec. 2 — National Exposition of Power and Mechanical Engineering, New York.

Nov. 29-Dec. 1 — American Society for Testing Materials and American Institute of Mining and Metallurgical Engineers, technical meeting, Philadelphia.

Nov. 30 — American Society of Mechanical Engineers, Rubber Plastics Division, New York.

Dec. 4-6 — SAE National air cargo meeting, Chicago.

Dec. 10-13 — American Society of Refrigerating Engineers, 40th annual meeting, New York.

Jan. 8-12 — SAE Annual Meeting, Detroit.

Jan. 10-11 — Institute of Scrap Iron & Steel, Inc., annual meeting, Cincinnati.

WLB Members Attempt To Resign in Face of 13,000 Cases

Washington

• • • As WLB prepares to send within a few days a report of the facts in the Steel Wage Case, together with a new cost of living study, the board seemed to fall apart with its chairman and two other public members trying to resign.

Chairman William H. Davis and public members Dr. George W. Taylor, vice-chairman and Dr. Frank P. Graham have submitted their resignations to the President, but he has not accepted them. All three men said that they would be willing to stay on until the pending cases are decided and each gave personal reasons for wanting to leave.

Mr. Davis said he had always wanted to slow down after his 65th birthday (which coincided with his attempted resignation on Aug. 29). Dr. Taylor who had agreed that he would leave when Mr. Davis did, submitted his resignation Oct. 19. He wishes to return to the University of Pennsylvania where he was an economics professor. Dr. Graham said that the University of North Carolina of which he is president has requested his return.

There are 13,000 cases before the board—about 10,000 merely require board approval of agreements reached between employees and their employers. Only about 3000 require hearing and formal decision.

Expectations are that the Steel Wage Case will be settled before Nov. 20, the date set for convening the CIO convention. There are rumors that the CIO-USW will abandon its demand for retroactive award, should this proposal be made by the President.

Canadian Shipyards to Be Busy on Cargo Ships

Ottawa

• • • Following reports that the building of minesweepers in Canada would be suspended, announcement has been made here by the Department of Munitions and Supply that shipyards in British Columbia and in Quebec will be kept busy for the next year at least building smaller cargo ships. In this connection the Department states that contracts have been let to four Quebec and West Coast shipbuilders for 16 350-ton coastal

cargo ships at a cost of approximately \$450,000 each, to be completed late in 1945.

The ships will be built for Wartime Shipbuilding Ltd., on behalf of the British Ministry of War Transport. They will be steel hulled with an 8½ ft. draught and length of 140 ft. and will serve as all-purpose cargo carriers in the Pacific.

Contracts have been let as follows: George T. Davie & Sons Ltd., Lauzon, Que., four; Morton Engineering & Drydock Co. Ltd., Quebec, Que., four; North Van Ship Repairs Ltd., Vancouver, B.C., five; Victoria Machinery Depot, Victoria, B.C., three.

Dresser Industries Move Headquarters To Cleveland Area

Cleveland

• • • Dresser Industries, Inc., a \$35,000,000 enterprise comprising ten companies, and one of the country's leading manufacturers of equipment for the oil, gas and industrial fields, will move headquarters here from Bradford, Pa., according to announcement of H. N. Mallon, president. The factory of the Dresser Mfg. Division at Bradford, up to now parent corporation of the Dresser group, will remain in Bradford and operate as Dresser Mfg. Division of Dresser Industries, Inc. The firm's legal, public accounting, advertising and public relations counsels are Cleveland firms and already located here are two units—the Bryant Heater Co.—and an affiliate, Van der Horst Corp.

Latest units to come into the

Dresser fold are International Derrick & Equipment Co., Columbus, and Stacey Bros. Gas Construction Co., Cincinnati. Other member companies include: Clark Bros. Co., Inc., Olean, N. Y.; Pacific Pumps, Inc., Huntington Park, Cal.; Roots-Connersville Blower Corp., Connorsville, Ind.; Bovaird & Seyfang Mfg. Co., Bradford, Pa., and Dresser Mfg. Co., Ltd., Toronto, Ont.

Boeing's Backlog Increases with New Contract for B-29's

Seattle

• • • Boeing's backlog of unfilled orders increased to \$1,145,000,000 when the Army recently placed a new contract for 1000 additional B-29 Superfortresses. The number of B-29's originally ordered is still a military secret, but the company and its employees are now assured of capacity operation until well into 1946, regardless of any VE-Day terminations or cut-backs, since the B-29 is regarded as the spearhead in the Pacific operations against Japan where long range bombers will be needed until VJ-Day.

Boeing's principal problem continues to be manning. Since last January the ratio of women workers in the Seattle and Renton plants has increased from 53 to 57 per cent and continues to climb. Assembly, sub-assembly and fabrication on the B-29 is heavier work than on any previous aircraft and requires more men. Boeing wants at least 50 per cent of its workers males and would like to reach 55 per cent. The current decline in the percentage of males does not occur from increase in male terminations but rather from a decline in the number of new males hired.

Cited for Awards

• • • The following companies have received the Army-Navy "E" for outstanding war production:

Dover Stamping & Mfg. Co., Cambridge, Mass.
Henry Disston & Sons, Inc., Philadelphia. (first star)
Hobart Mfg. Co., Troy, Ohio. (third star)
Owens-Corning Fiberglas Corp., Newark, Ohio. (fourth star)
Aiseal & Aircraft, Inc., Elmhurst, Long Island, N. Y.
American Meter Co., Philadelphia.
Automatic Winding Co., East Newark, N. J.
Baker-McMillen Co., Akron, Ohio.
Bucyrus-Erie Co., Bucyrus-Erie Evansville Plant, Evansville, Ind.
Cattaraugus Cutlery Co., Little Valley, N. Y.
Cutler Metal Products Co., Camden, N. J.
Elgin National Watch Co., Plant No. 1, Elgin, Ill.
Forgings & Stampings, Inc., Rockford, Ill.
Gemloid Corp., Elmhurst, Long Island, N. Y.
Goodyear Yellow Pine Co., Picayune Plant, Picayune, Miss.
Harmon Color Works, Inc., Haledon Plant, Haledon, N. J.
Hilo Varnish Co., Brooklyn.
C. S. Johnson Co., Champaign, Ill.
Lamson Corp., Syracuse, N. Y.
Milwaukee Gas Specialty Co., Milwaukee.
Pet Milk Co., Wisconsin Plant, Belleville, Footville and Sparta, Wis.
Plastic Turning Co., Inc., Leominster, Mass.
Polson Rubber Co., Garrettsville, Ohio.
Precision Mfg. Co., Detroit.
Seaboard Coil Spring Corp., Los Angeles.
A. G. Spalding & Brothers, Inc., Willimansett & Chicopee Plants, Chicopee, Mass.
Union Chevrolet Co., Memphis, Tenn.
Walters Mfg. Co., Oakmont Plant, Oakmont, Pa.
George Weston, Ltd., Salamanca Plant, Salamanca, N. Y.
Woodstock Typewriter Co., Woodstock, Ill.

October Steel Output Is Highest Since May

New York

• • • Steel production in October totaled 7,578,304 tons of ingots and castings, the greatest production since May of this year, according to the American Iron & Steel Institute.

The October production was substantially above output of 7,193,496 tons in September but was below the record month of October of last year when 7,814,117 tons were produced.

Total steel production in the first 10 months of 1944 was reported at 74,777,771 tons, as against 74,209,247 tons in the corresponding period of 1943.

During October the industry operated at an average of 95.1 per cent of capacity, as against 93.4 per cent of capacity in September and 101.2 per cent in October a year ago.

An average of 1,710,678 tons of steel was produced per week in October, compared with 1,680,723 tons per week in September and 1,763,909 tons per week in October, 1943.

• • • Total net steel shipments in September were up 7522 net tons from August. Major factor was the continuation in the decline of plate shipments. Other items showed little change of significance. Steel plates in January of this year represented almost 21 per cent of total steel shipments. By August steel plates represented 16.5 per cent and according to present market indications, further cuts scheduled in steel plate directives will make the percentage of plate production to total steel production even smaller by the year's end. Part of this change in steel distribution has been made up by increases in the volume of sheets being produced. At the same time, however, the lower plate load sets free steel for products other than sheets.

American Iron and Steel Institute Capacity, Production and Shipments

| STEEL PRODUCTS | Number of Companies | Items | Maximum Annual Potential Capacity, Net Tons | SEPTEMBER, 1944 | | | | TO DATE THIS YEAR | | | |
|--|---------------------|-----------|---|-----------------|----------------------|----------------------|--|-------------------|----------------------|----------------------|--|
| | | | | Production | | Shipments (Net Tons) | | Production | | Shipments (Net Tons) | |
| | | | | Net Tons | Per Cent of Capacity | Total | To Members of the Industry for Conversion into Further Finished Products | Net Tons | Per Cent of Capacity | Total | To Members of the Industry for Conversion into Further Finished Products |
| Ingots, blooms, billets, tube rounds, sheet and tin bars, etc. | 50 | 1 | | | | 729,811 | 248,534 | | | 6,582,620 | 2,179,594 |
| Structural shapes (heavy) | 11 | 2 | 9,152,250 | 311,898 | 43.7 | 310,698 | | 2,960,120 | 44.2 | 2,880,296 | |
| Steel piling | 4 | 3 | | 15,631 | | 14,227 | | 70,922 | | 71,402 | |
| Plates (sheared and universal) | 25 | 4 | 16,726,420 | 1,011,247 | 73.9 | 990,773 | 54,613 | 10,066,308 | 80.4 | 9,766,376 | 502,327 |
| Skelp. | 6 | 5 | | | | 70,466 | 58,285 | | | 626,966 | 492,637 |
| Rails—Standard (over 60 lbs.) | 4 | 6 | 3,625,000 | 191,802 | 64.8 | 197,652 | | 1,723,457 | 63.5 | 1,708,237 | |
| —All other | 6 | 7 | 525,000 | 13,341 | 31.0 | 16,434 | | 141,998 | 36.1 | 148,045 | |
| Splice bars and tie plates | 13 | 8 | 1,743,500 | 59,421 | 41.6 | 59,983 | | 598,507 | 45.9 | 612,386 | |
| Track spikes | 10 | 9 | 350,640 | 12,049 | 42.0 | 12,633 | | 110,399 | 42.1 | 117,560 | |
| Hot Rolled Bars—Carbon | 37 | 10 | | 706,862 | | 587,497 | 90,459 | 6,530,773 | | 5,407,462 | 710,166 |
| —Reinforcing—New billet | 16 | 11 | | 47,316 | | 47,316 | | 366,755 | | 395,131 | |
| —Rerolled | 14 | 12 | | 5,531 | | 4,318 | | 52,239 | | 61,851 | |
| —Alloy | 24 | 13 | | 244,231 | | 182,866 | 35,290 | 2,329,919 | | 1,699,751 | 326,089 |
| —Total | 47 | 14 | 22,041,870 | 1,003,940 | 55.6 | 831,316 | 125,749 | 9,279,686 | 56.2 | 7,564,195 | 1,036,255 |
| Cold Finished Bars—Carbon | 23 | 15 | | 152,868 | | 152,517 | | 1,353,744 | | 1,349,126 | |
| —Alloy | 22 | 16 | | 34,620 | | 30,547 | | 307,075 | | 278,582 | |
| —Total | 30 | 17 | 2,802,250 | 187,488 | 81.7 | 183,064 | | 1,660,819 | 79.2 | 1,827,708 | |
| Tool steel bars | 17 | 18 | 269,940 | 13,171 | 59.6 | 12,055 | | 109,221 | 54.0 | 103,708 | |
| Pipe and Tubes—Butt weld | 16 | 19 | 2,162,870 | 121,206 | 68.5 | 122,182 | | 1,069,865 | 66.1 | 1,070,448 | |
| —Lap weld | 8 | 20 | 920,200 | 47,433 | 63.0 | 47,563 | | 432,072 | 62.7 | 432,485 | |
| —Electric weld | 9 | 21 | 1,303,300 | 70,364 | 66.0 | 68,125 | | 617,117 | 63.2 | 612,667 | |
| —Seamless | 15 | 22 | 2,617,300 | 196,179 | 91.6 | 201,936 | | 1,750,330 | 89.3 | 1,770,182 | |
| —Conduit | 7 | 23 | 187,000 | 6,124 | 40.0 | 5,307 | | 44,564 | 31.8 | 43,817 | |
| —Mechanical tubing | 12 | 24 | 1,050,400 | 72,888 | 64.8 | 64,667 | | 619,636 | 78.8 | 606,567 | |
| Wire rods | 26 | 25 | 7,026,470 | 354,642 | 61.7 | 114,638 | 36,572 | 3,380,757 | 64.3 | 1,040,718 | 340,720 |
| Wire—Drawn | 42 | 26 | 5,715,600 | 302,509 | 64.7 | 184,613 | 10,554 | 2,756,268 | 64.4 | 1,626,576 | 78,624 |
| —Nails and staples | 19 | 27 | 1,247,420 | 47,828 | 46.8 | 48,944 | | 498,137 | 53.3 | 489,006 | |
| —Barbed and twisted | 15 | 28 | 546,030 | 20,992 | 47.0 | 21,152 | | 190,391 | 46.6 | 188,647 | |
| —Woven wire fence | 16 | 29 | 1,112,200 | 30,908 | 33.9 | 31,719 | | 286,120 | 34.4 | 282,811 | |
| —Bale ties | 12 | 30 | 149,500 | 6,054 | 49.5 | 6,286 | | 58,491 | 52.3 | 56,989 | |
| Black Plate—Ordinary | 9 | 31 | | | | 44,157 | | | | 365,202 | 908 |
| —Chemically treated | 8 | 32 | 464,000 | 7,363 | 19.4 | 6,633 | | 106,598 | 30.7 | 100,344 | |
| Tin and Terne Plate—Hot dipped | 9 | 33 | 3,719,650 | 185,927 | 61.1 | 160,021 | | 1,462,549 | 52.5 | 1,506,413 | |
| —Electrolytic | 10 | 34 | 2,155,100 | 50,129 | 28.4 | 43,664 | | 489,817 | 30.4 | 458,051 | |
| Sheets—Hot rolled | 29 | 35 | 19,933,720 | 1,080,933 | 66.2 | 555,324 | 31,180 | 9,506,700 | 63.7 | 4,816,648 | 199,748 |
| —Cold rolled | 13 | 36 | 7,286,380 | 337,014 | 56.5 | 180,519 | | 2,779,651 | 51.0 | 1,494,583 | |
| —Galvanized | 15 | 37 | 2,826,130 | 121,113 | 52.4 | 123,618 | | 990,862 | 46.8 | 982,425 | |
| Strip—Hot rolled | 22 | 38 | 8,649,200 | 228,788 | 32.3 | 142,505 | 21,034 | 2,016,133 | 31.1 | 1,283,750 | 206,613 |
| —Cold rolled | 35 | 39 | 3,266,470 | 101,717 | 38.0 | 96,674 | | 900,552 | 36.8 | 845,235 | |
| Wheels (car, rolled steel) | 5 | 40 | 348,800 | 24,297 | 85.1 | 24,842 | | 220,094 | 84.3 | 216,130 | |
| Axes | 6 | 41 | 416,170 | 14,321 | 42.0 | 14,446 | | 151,704 | 48.7 | 146,719 | |
| All other | 5 | 42 | 168,790 | 4,953 | 35.8 | 4,590 | | 35,603 | 28.2 | 35,174 | |
| TOTAL STEEL PRODUCTS | 154 | 43 | | | | 5,743,437 | 586,501 | | | 52,301,086 | 5,037,426 |
| Effective steel finishing capacity | 154 | 44 | 64,722,000 | | | | | | | | |
| Per cent of shipments to effective finishing capacity | 154 | 45 | | | | 97.3% | | | | | 97.5% |

During 1943 the companies included above represented 98.9% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.



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Batcheller Promises Early View of Plan For Plant Changeover

New York

• • • In the near future industry will get a blue print of streamlined regulations which will become effective when Germany is defeated, Hiland Batcheller, WPB chief of operations, told members of the American Management Association here.

"All industry will have in advance

the rules of the game as well as they can be predicted," Mr. Batcheller said. According to observers this commitment will clear up some of the cloudiness on the reconversion problem. Many industries have been hampered by uncertainties on what would or would not be done in the period after Germany is crushed.

"The fullest possible relaxation of present limitation and conservation orders is contemplated," Mr. Batcheller said in his address, read in his absence by Andrew Stevenson, his

assistant. "It now is proposed to revoke a substantial number of all our present orders. Generally, only in the fields of lumber, textiles and chemicals does it now appear there will be any large need for continuing controls."

Lemuel Boulware, former vice-chairman in charge of operations of the WPB, who presided at the meeting, stressed the vital necessity of attractive prices and speed in starting reconversion. He asserted that new products which have been developed during the war period offer little hope of immediate production volume. They have great possibilities, he said, "but they will not spring into full production overnight and provide the necessary high employment in the immediate postwar period."

"Immediate production should center on staples, instead of specialties, and particular emphasis should be placed on items which will yield three-shift operations. Moreover, there should be a house-cleaning of items representing hidden costs and high-selling expense. A buyer's market will return with the end of the war and industry must prepare itself to walk humbly with many customers instead of the single one it had during the war period."

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

Based on Reports by Companies which in 1943 made 98.3 Per Cent of the Open Hearth, 100 Per Cent of the Bessemer and 87.9 Per Cent of the Electric Ingot and Steel for Castings Production.

Source: American Iron & Steel Institute

1944

| PERIOD | ESTIMATED PRODUCTION—ALL COMPANIES | | | Calculated* Production of Companies in (Net Tons) Month |
|------------------|---------------------------------------|-----------------------------------|-----------------------------------|--|
| | OPEN HEARTH | BESSEMER | ELectRIC | |
| | Per Cent* Net of Tons* Capacity | Per Cent of Net Tons* Capacity | Per Cent of Net Tons* Capacity | Per Cent of Net Tons* Capacity |
| January..... | 6,769,438 97.2 | 439,551 85.4 | 377,751 83.3 | 7,586,740 95.6 |
| February..... | 6,410,338 95.5 | 409,781 85.2 | 368,555 87.0 | 7,188,674 96.9 |
| March..... | 6,976,450 100.1 | 455,368 88.5 | 388,408 85.7 | 7,820,226 98.5 |
| 1st Quarter.... | 20,156,226 98.6 | 1,304,700 86.4 | 1,134,714 85.3 | 22,595,640 97.0 |
| April..... | 6,708,895 100.3 | 437,517 87.8 | 362,118 82.5 | 7,583,530 98.5 |
| May..... | 6,860,532 98.5 | 435,980 85.3 | 380,960 84.0 | 7,680,472 96.8 |
| June..... | 6,452,087 95.6 | 418,117 83.9 | 347,028 79.0 | 7,217,232 93.9 |
| 2nd Quarter.... | 20,081,514 98.1 | 1,294,614 85.6 | 1,090,106 81.9 | 22,466,234 96.4 |
| 1st 6 months.... | 40,237,740 98.4 | 2,599,314 86.0 | 2,224,820 83.6 | 45,061,874 96.7 |
| July..... | 6,723,994 96.7 | 415,593 80.9 | 334,710 74.0 | 7,474,297 94.4 |
| August..... | 6,691,262 96.0 | 429,637 83.5 | 348,901 77.0 | 7,469,800 94.1 |
| September..... | 6,464,631 95.6 | 398,028 80.0 | 330,875 75.2 | 7,193,496 93.4 |
| 3rd Quarter.... | 19,879,887 95.8 | 1,243,258 81.5 | 1,014,448 75.2 | 22,137,593 93.7 |
| 9 months.... | 60,117,627 97.5 | 3,842,572 84.5 | 3,239,268 80.8 | 67,199,467 95.7 |
| October..... | 6,822,670 97.5 | 420,108 81.6 | 335,526 73.7 | 7,578,304 95.1 |
| | | | | 1,710,678 4.43 |

Note—The percentages of capacity operated are calculated on weekly capacities of 1,572,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944, as follows: Open hearth 82,223,610 net tons, Bessemer 6,074,000 net tons, Electric 5,350,880 net tons.

* Revised January through March, 1944.

1943

| PERIOD | ESTIMATED PRODUCTION—ALL COMPANIES | | | Calculated* Production of Companies in (Net Tons) Month |
|------------------|---------------------------------------|-----------------------------------|-----------------------------------|--|
| | OPEN HEARTH | BESSEMER | ELectRIC | |
| | Per Cent* Net of Tons* Capacity | Per Cent of Net Tons* Capacity | Per Cent of Net Tons* Capacity | Per Cent of Net Tons* Capacity |
| January..... | 6,576,788 97.8 | 478,161 85.9 | 369,573 95.5 | 7,424,522 96.8 |
| February..... | 6,031,605 99.3 | 447,810 89.1 | 345,189 98.8 | 6,824,604 98.5 |
| March..... | 6,787,902 100.9 | 503,565 90.4 | 383,111 99.0 | 7,674,578 100.0 |
| 1st Quarter.... | 19,396,295 99.3 | 1,429,536 88.4 | 1,097,873 97.7 | 21,923,704 98.4 |
| April..... | 6,510,824 99.9 | 482,478 89.5 | 380,401 101.5 | 7,373,703 99.3 |
| May..... | 6,669,703 99.1 | 482,424 86.6 | 397,564 102.7 | 7,549,691 98.4 |
| June..... | 6,202,889 95.2 | 453,663 84.1 | 382,801 102.1 | 7,039,353 94.8 |
| 2nd Quarter.... | 19,383,416 98.1 | 1,418,565 88.6 | 1,160,766 102.1 | 21,962,747 97.5 |
| 1st 6 months.... | 38,779,711 98.7 | 2,848,101 87.6 | 2,258,639 99.9 | 43,886,451 98.0 |
| July..... | 6,555,794 96.8 | 466,345 90.6 | 384,737 91.9 | 7,407,876 96.2 |
| August..... | 6,700,118 98.7 | 484,847 94.0 | 401,499 95.7 | 7,586,464 98.3 |
| September..... | 6,646,968 101.4 | 480,757 96.4 | 386,614 95.4 | 7,514,339 100.7 |
| 3rd Quarter.... | 19,903,880 99.0 | 1,431,949 93.6 | 1,172,850 94.4 | 22,508,679 98.4 |
| 9 months..... | 58,683,591 98.8 | 4,280,050 89.5 | 3,431,489 98.0 | 66,395,130 98.1 |
| October..... | 6,892,029 101.6 | 513,585 99.5 | 408,503 97.4 | 7,814,177 101.2 |
| November..... | 6,543,204 99.6 | 440,878 88.2 | 387,893 95.5 | 7,371,975 98.6 |
| December..... | 6,502,980 96.0 | 390,979 75.9 | 361,185 86.3 | 7,255,144 94.2 |
| 4th Quarter.... | 19,938,213 99.1 | 1,345,442 87.9 | 1,157,581 93.1 | 22,441,236 98.0 |
| 2nd 6 months.... | 39,842,093 99.0 | 2,777,391 90.8 | 2,330,431 93.7 | 44,949,915 98.2 |
| Total..... | 78,621,804 98.9 | 5,625,492 89.1 | 4,589,070 96.7 | 88,536,366 98.1 |

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,380 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943, as follows: Open hearth 79,180,890 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons. Beginning July 1, 1943, the percentages of capacity operated are calculated on weekly capacities of 1,531,789 net tons open hearth, 116,494 net tons Bessemer and 94,667 net tons electric ingots and steel for castings, total 1,742,950 net tons; based on annual capacities as follows: Open hearth 79,867,450 net tons, Bessemer 6,074,000 net tons, Electric 4,935,960 net tons.

* Revised January through December, 1943.

Kaiser Orders Utah Ore

San Francisco

• • • More than a million tons of high grade Utah iron ore have been contracted for by the Kaiser Co. Inc., according to an announcement by Senator F. Walker, of Salt Lake City, Utah. It will be shipped 475 miles to Kaiser's Fontana plant at the rate of 1500 tons a day as soon as loading, processing, and shipping equipment is installed.

The ore will come from the Excelsior Deposit in the Iron Springs District nine miles west of Cedar City, the same general region where ore for both the Provo and Geneva, Utah, furnaces is obtained.

The Utah Construction Company, one of the original six companies associated with Henry J. Kaiser in major contracting enterprises will install and operate the ore handling equipment at an approximate cost of \$300,000. The tariff rate for shipment of iron ore from Lund, Utah, to San Bernardino, Calif., by Union Pacific is \$4.10 per net ton and a minor additional cost will be involved to complete the delivery at Fontana, a few miles distant from San Bernardino. The last leg of the delivery is by Santa Fe or Southern Pacific.

WHAT'S A BAR OF STEEL

worth?



Who can tell? Take this piece of steel, for instance. It's an ordinary round bar... selling price, \$2.62. But it could be worth the figure shown on the tag above.

Here's a typical case: One of our customers, facing a break-down, ordered such a bar. One hour and twenty-eight minutes later, it was delivered. Time, place, specifications... just right! An overnight delay would have cost this customer \$2,027.00 in time alone.

Whether you require a bar of steel or several carloads, *the material can be worth no more than the service behind it!*

**LEVINSON
STEEL SALES CO.**

33 PRIDE STREET • PITTSBURGH, PENNA.



ESS-6

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Tractor-Footed*

ROUSTABOUT CRANE



**The fast-action all-around-your-
plant load-handler**



Roustabouts are engineered and built for years of overwork—rugged construction, ball-bearing boom turntable and operating parts run in oil.

BIG crates onto truck . . . heavy stuff off or on a freight car . . . overhauled engines remounted to aircraft . . . scrap metal loaded with a magnet . . . bales, drums, boxes picked off a high pile—or stacked there . . . machines moved . . . hundreds of different load-handling jobs—and your Roustabout is always ready, where and when you want it. It's most kinds of material handling all in one, mobile, versatile, powerful, saving time, cost, manpower. Hundreds of industries report their Roustabout Cranes invaluable, indispensable. Make one of these handy action-getters a part of your plans for postwar efficiency and expense cutting—write for the whole story, today.

THE HUGHES-KEENAN COMPANY
571 NEWMAN ST. • MANSFIELD, OHIO



Roustabout Cranes

By Hughes-Keenan

Load-Handling Specialists Since 1904

NEWS OF INDUSTRY

Harvard Study Indicts Management on Lack Of Production Teamwork

Cambridge, Mass.

• • • Lack of attention by management to the organization of teamwork and team spirit among production line workers is a major weakness in the American industrial setup under both wartime and peacetime conditions, according to a Harvard Business School study.

The financial loss involved in labor turnover and absenteeism resulting from neglect of worker morale can be overlooked by firms enjoying wartime prosperity, but the defect may prove fatal to many companies in the highly competitive postwar period, the report states.

The present investigation was made in the major aircraft plants of Southern California. Professor Elton Mayo, George F. F. Lombard, John B. Fox and Jerome F. Scott contributed. They state that this study confirms earlier findings by them and others in the field of human relations in industry.

They point out that "many companies have been able to achieve astonishing production records during the war because their managements have built up team relations among workers." Further confirmation of this is found, they explain, in a Naval officers' report stressing the importance of team relationships among the crews of Navy ships as one of the main preventives of breakdowns resulting from combat fatigue.

Praising the phenomenal production records of the California aircraft plants, the Business School study adds that "this remarkable achievement has not been accomplished without cost, a measure of which has been a great expenditure in absences and labor turnover."

The study says: "Although it is clearly evident that the pressure for production and constant changes of schedule which reached a peak in the aircraft industry during the years 1942 and 1943 made impossible that organization of operations which must be the basis of teamwork, the conclusions of our study indicate that management's lack of awareness of the need to consider the requirements of balanced operation made it in a significant way responsible for the absences and turnover for which workers are so widely blamed."

"In fact our conclusions further indicate that this defect in manage-

Your Never-Failing Source of Quality Electrodes for Every Type of Weld

The reasons for the superior performance of Reid-Avery Electrodes can be stated simply and briefly: Twenty-five years' experience, the best and most modern equipment plus skilled

craftsmanship constantly guided by advanced laboratory procedure. • It is under such favorable conditions that each of the following complete list of Reid-Avery Electrodes is produced.

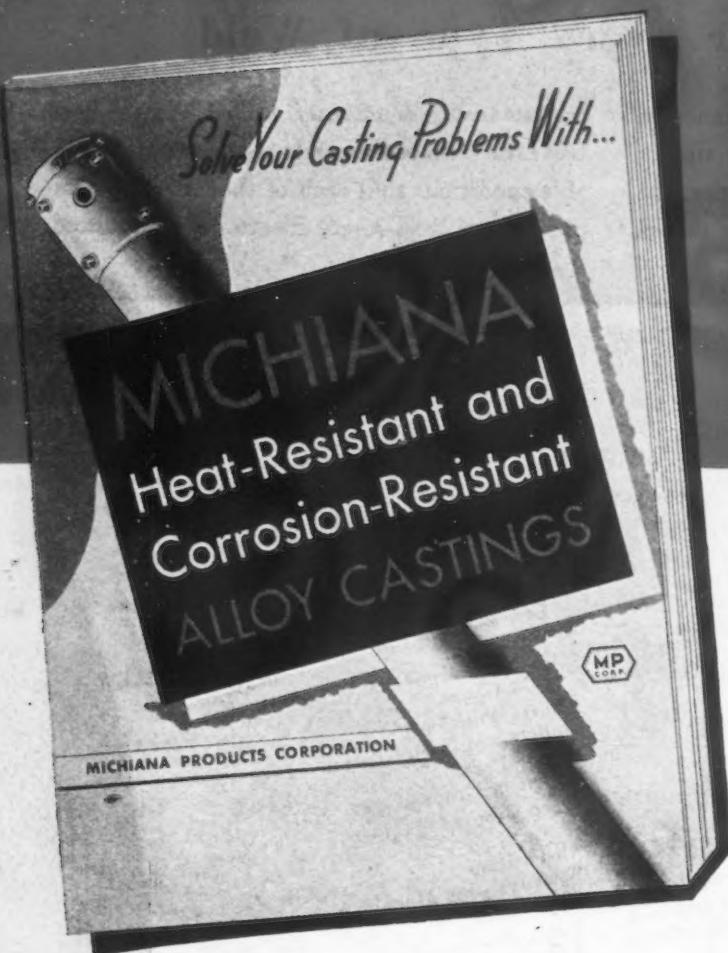
| ELECTRODE | A.W.S. CLASSIFI- CATION | MATERIAL TO BE WELDED | TYPE OF WORK | CURRENT |
|---------------|-------------------------------|---------------------------------------|---------------------------|----------------------|
| RACO 7 | E-6010 | Mild Steel | All Position | Rev. Pol. |
| RACO 11 | E-6011 | Mild Steel | All Position | A.C. |
| RACO 8 | E-6012 | Mild Steel | General Purpose | Str. Pol. or A.C. |
| RACO 8 | E-6013 | Mild Steel | Poor Fit-up | Str. Pol. or A.C. |
| RACO 6 | E-6020 | Mild Steel | General Purpose | A.C. or D.C. |
| RACO 20 | E-6030 | Mild Steel | Light Gauge | A.C. or D.C. |
| RACO 5 | E-6030 | Mild Steel | Butts, Positioned | A.C. or D.C. |
| RACO 82 | None | Steel | Fillets and Deep Grooves | A.C. or D.C. |
| RACO 74 | E-7010 | High Strength Steels | Single Pass | A.C. or D.C. |
| RACO 64 | E-7020 | High Strength and | Fillets or Grooves | A.C. or D.C. |
| RACO 13 | E-7030 | Silicon-killed Steels | Deep Grooves | Str. Pol. |
| TYPE D | E-4511 | Mild Steel | All Position | Rev. Pol. |
| TYPE D | E-4521 | Mild Steel | Wear-resisting Machinable | A.C. or D.C. |
| 30-40 C | None | Steel | All Position | A.C. or D.C. |
| TYPE M | E-4511 | Mild Steel | Butts, Positioned | Str. Pol. |
| BLUE LABEL | E-4521 | Mild Steel | Fillets and Deep Grooves | Str. Pol. |
| 19.9 | E-4510 | Mild Steel | General Purpose | Str. Pol. |
| RACOLLOY | E-4520 | Stainless and Air-Hardening Steels | Poor Fit-up | Str. Pol. |
| 25-20 | None | Stainless and Air-Hardening Steels | Automatic or Manual | Str. Pol. |
| | | | Automatic or Manual | Str. Pol. |
| | | | Welding and Surfacing | Rev. Pol. or A.C. |
| | | | Welding and Surfacing | Rev. Pol. or A.C. |

REID-AVERY COMPANY

DUNDALK BALTIMORE 22 MARYLAND

SINCE 1919 • PRODUCERS OF ARC WELDING ELECTRODES
AND WELDING RODS

LATEST DATA



ON MICHIANA HEAT- AND CORROSION-RESISTANT ALLOYS

War-time demands have demonstrated still further the ability to maintain uniform high standards in the production of MICHIANA Alloy Castings. Improved facilities and foundry technique,—added experience in meeting the requirements of a host of America's most important industrial organizations assure your getting castings that fit your exact requirements.

Our new literature contains the data on the various leading alloys with illustrations to indicate the wide range of usage. A copy of this new Booklet No. 110 will be mailed on request. MICHIANA PRODUCTS CORPORATION, Michigan City, Ind.



- Muffles
- Boxes
- Rails
- Rolls
- Sprockets
- Retorts
- Pots
- Grids
- Tubes
- Chains
- Heat Exchangers

ment method, if continued in the post-war period, will have serious effects on our industrial structure. It is our belief that when top management realizes the importance of the human aspect of industrial organization, it will demand of executives and supervisors an adequacy in problems of human administration that will balance the present insistence on technical capacity."

Requisite for success in industry, the report states, is "a balanced relation among applied science, the organization of operations, and the organization of teamwork."

"In the United States, as elsewhere, the relation among these three is out of balance; Applied science and the appropriate skills have been magnificently developed; the organization of operations has been given much study and attention; but the organization of teamwork has been almost wholly neglected."

Workers have a persistent desire for active association in teamwork with others, the report shows. "If the deep-seated desire is defeated, it will take the form of exaggerated absenteeism and labor turnover, so that management by its inattention to the organization of teamwork in the factory is in a significant way responsible for the conditions for which it blames the workers."

In the plants studied it was found that "it is possible in a situation characterized by constant and almost chaotic change that the natural processes of group association may be almost wholly defeated."

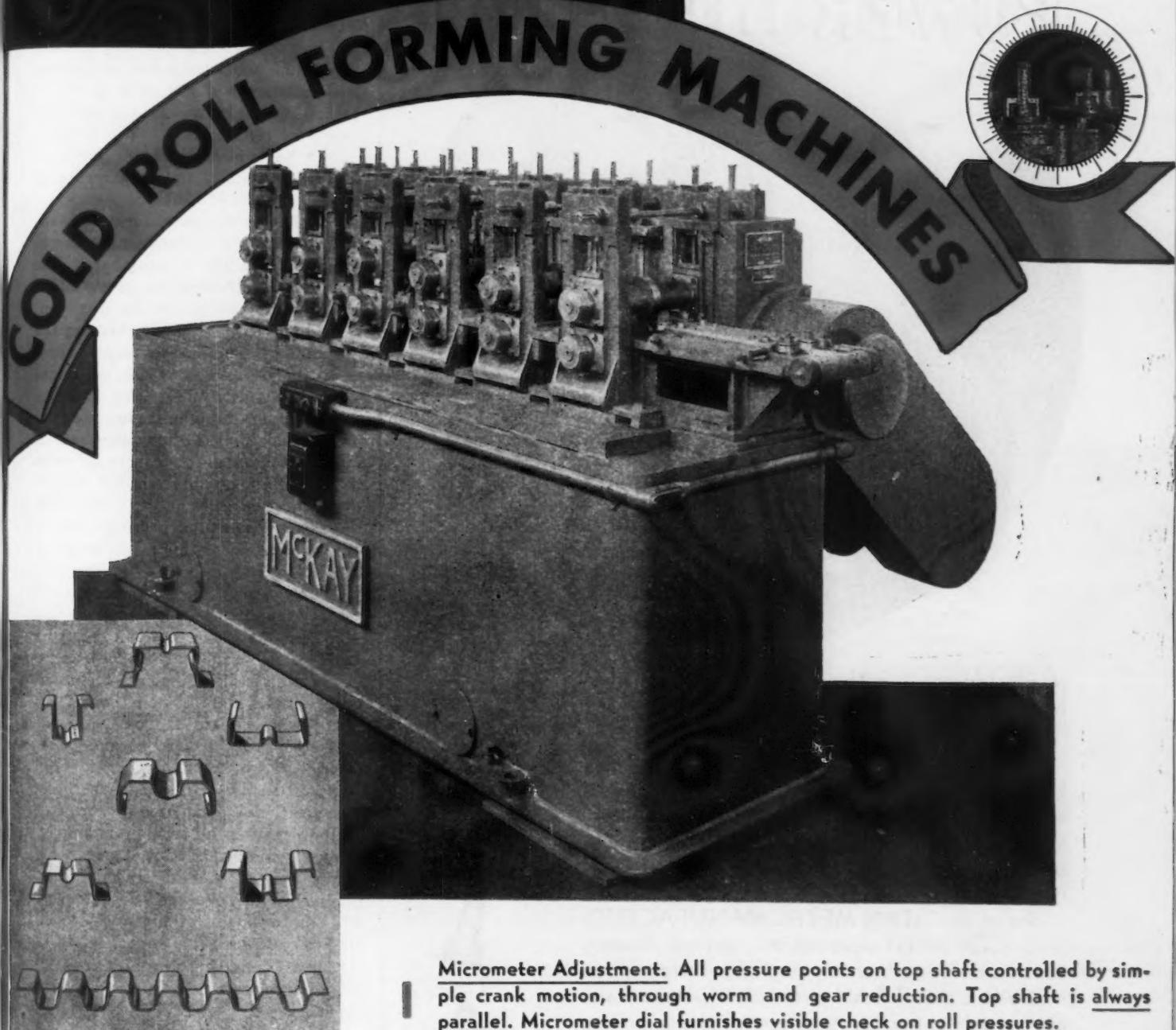
Management in the aircraft plants under pressure of necessity moved individuals and groups by loans and transfers within the company so that labor turnover within the plant was even greater than at the factory gate. "Management does not seem to have been aware of the probable consequences of such action."

"The research here reported points to the methods of first-line supervision as of critical importance to the control of absenteeism and labor turnover. The unsettled social background of life and work on the West Coast makes the supervisory attitude even more important in California than in Eastern munitions factories.

"The research also shows that, except in sporadic instances, first-line supervision is unlikely to use such methods in situations where top management does not clearly understand

MCKAY

MEET INDUSTRY'S DEMAND FOR
QUICK CHANGEOVER TO THE VARI-
ETY OF SECTIONS OR FORMS NEEDED



Send your drawings or samples for quotations
on equipment built to suit your needs.

ENGINEERS
AND MANUFACTURERS OF
TUBE MILLS
USING
ELECTRIC RESISTANCE WELD
OXY-ACETYLENE WELD
ATOMIC HYDROGEN WELD

1 Micrometer Adjustment. All pressure points on top shaft controlled by simple crank motion, through worm and gear reduction. Top shaft is always parallel. Micrometer dial furnishes visible check on roll pressures.

2 Typical Rugged McKay Construction. Standardized units, choice of gearing, anti-friction bearings throughout, all gears between bearings, not overhung.

3 Interchangeable Guiding Equipment, easily adjusted, quickly removable.

4 Minimum Changeover Time. All units engineered to allow complete roll change in shortest possible time.

5 Low Maintenance Cost. All of the above features, plus precision workmanship and up to the minute engineering are a guarantee of low maintenance.



The **MCKAY MACHINE** *Company*
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

MORE POWER to the POWER INDUSTRY



★ Electric power is the very life blood of industry. Without it, mass production ceases.

The gigantic power industry, without fan-fare, is doing a tremendous job today. In addition to the normal demands of industry and domestic consumers, it is supplying electrical energy to operate the machines of war that turn out planes, guns, ships and tanks—energy to drive motors that make our great nation the arsenal of the world.

We of the **TITAN METAL MANUFACTURING COMPANY** applaud this gallant industry which is doing such an amazing job, and take pride in the fact that **TITAN** Brass Hot Pressed Parts are used in many types of electrical equipment.

The **TITAN** plants are now working to capacity on war orders, but in the post-war market, when economy becomes a primary consideration, **TITAN** Hot Pressed Parts will again be available.



TITAN

METAL MANUFACTURING CO., BELLEFONTE, PA.
NEW YORK • CHICAGO • SAN FRANCISCO



Quality Alloys By Brass Specialists
Brass and Bronze Rod • Forgings • Die Castings • Welding Rods

NEWS OF INDUSTRY

the problem and give the supervisor its support. Yet, if first-line supervision is thus defective, the whole-hearted cooperation of workers in the purposes of management will not be secured."

When workers are properly formed into teams under their own recognized leaders, they will naturally do much to assist the purposes of management, the report shows. These teams should be kept together as units as much as possible, and transferred as units.

"As a team begins to form, it takes over the task of maintaining communication with all its members. The need for administration is not done away with, but it can be less concerned with problems of achieving the intimate discipline necessary to promote the objectives of the organization—regular attendance, for instance. This function the team takes over for itself; and it is a function that, if management alone is concerned with it, leads almost inextricably to an evercomplicating web of complaints, the settlement of one of which serves only to provoke the expression of another.

"Thus teams and administration, the relation among workers and their relations to their supervisors, support each other when there is a balance in administration among technical, operational, and human considerations; where there is not such balance, the result is discord and inefficiency."

Attention by management to the organization of the human needs of their workers is followed by an apparently spontaneous development of teams and of mutual responsibility, diminished turnover and absenteeism, and improvement in the quality and quantity of work, the report adds.



"Labor turnover and absenteeism, though exaggerated in an emergency period, are not merely phenomena of such a time. These problems existed before the war began and will continue when it is over."

"During the war, this country can no doubt afford to pay the high cost of absences and labor turnover. But after the war and during the period of contract terminations, neglect to consider the existent teams in the selection of workers for discharge can, as surely as Selective Service, strip our industrial organizations of whatever patterns of human collaboration have been achieved.

"This result will inevitably occur if through inadvertence existing teams and, more important, those informal

TAKES THE "Stick" OUT OF TABLEWAYS

SUN TABLEWAY LUBRICANT

Ends Shutdowns for Cleaning . . . Improves Finish of Work

Proper lubrication of ways and slides on all types of machines deserves the attention of every metal working plant. Lack of adequate lubrication can seriously disrupt production by necessitating frequent shutdowns of machines for cleaning of ways. Sticking, chattering or "floating" of ways can ruin the accuracy and finish of work, causing a high percentage of rejections. Sun Engineers, working closely with some of the leading builders of machine tools, have developed a new Tableway Lubricant which has overcome this problem in many plants.

Continual sticking of ways on the milling machines in a large Ohio factory, necessitated frequent shutdowns of their machines for cleaning. Valuable production hours on vital war materials were lost. The trouble, attributed to the lubricant's being washed out by the soluble oil, was studied by a Sun Engineer who then recommended Sun Tableway Lubricant.

Not a shutdown in two months has been required for cleaning tableways since the change in lubricant was made. The lubricant "stays put" . . . does not wash out.

Rejects have been greatly reduced because chattering and sticking have been eliminated, permitting more accurate work with a smoother finish.

Results like this are typical of Sun Tableway Lubricant . . . in fact are typical of the complete line of Sun Lubricants for all kinds of industrial machinery. No matter what your lubrication problem, experienced Sun Lubrication Engineers have the knowledge and the products to help you. A letter or phone call is all that is needed to place one of these "Doctors of Industry" at your service.

Also ask us for a copy of the new manual, "How To Get The Most Out Of Lubricants." There is no charge or obligation. Just write to . . .



SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News Voice of the Air—Lowell Thomas



SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

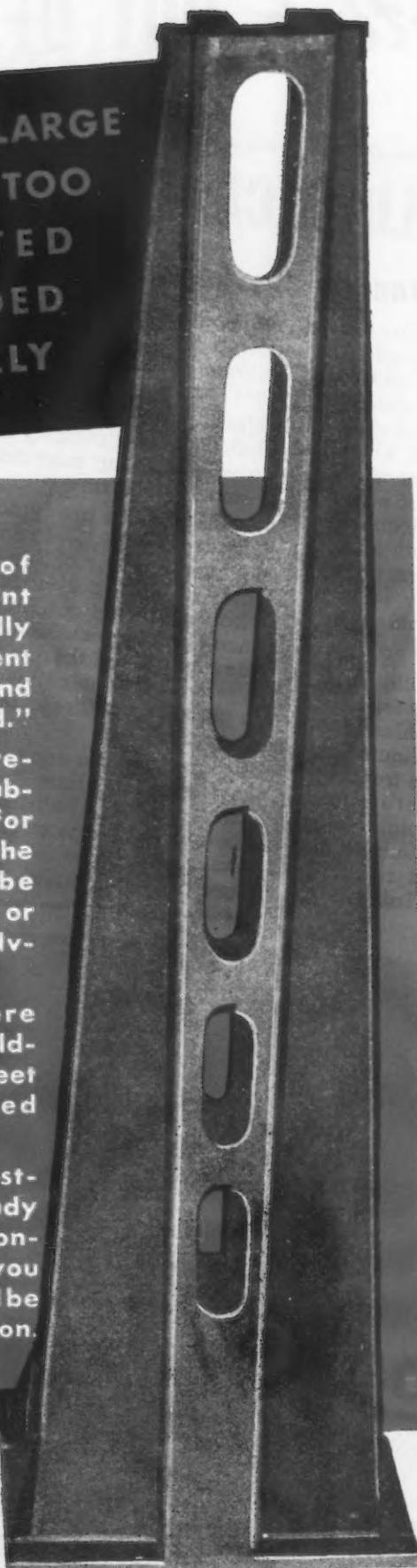
RARELY TOO LARGE
AND NEVER TOO
COMPLICATED
TO BE WELDED
SUCCESSFULLY

Thirty-one years of growth in equipment and welding skills fully warrant that statement . . . "rarely too large and never too complicated."

United Welding therefore invites you to submit your drawings for quotation . . . though the weldment desired be large or small, light or heavy, simple or involving special problems.

The former arm here shown, a typical weldment, measured 12 feet overall and weighed 1900 lbs.

How about that post-war unit? May we study the drawings — in confidence—and quote you on the parts that could be of welded construction.



THE UNITED WELDING CO.

MIDDLETOWN, OHIO

WELDING FABRICATORS OF MODERN DESIGNS

leaders who have the capacity to secure teamwork in others are discharged first.

"Under competitive conditions of manufacture, neglect of the problem of the organization of teamwork may increase costs to the point of forcing many plants out of business. The plant that does not know how to organize teamwork, that shrugs it off as mere humanitarianism, will be little equipped to meet the critical postwar problems of securing cooperation from persons of such diverse experience as civilian war workers and returning veterans."

Meehanite Institute Elects New Officers

New York

• • • About 200 representatives of the member foundries of the Meehanite Research Institute of America, Inc., New Rochelle, N. Y., attended the 16th annual meeting which was held at the Hotel Commodore recently. The program included presentation and exchange of research information as developed by member foundries, and the study of service records of wartime applications of Meehanite Castings in India, Australia, Africa, Great Britain and South America where similar institutes are in existence.

The following officers were elected for 1944:

President—Oliver Smalley, Meehanite Metal Corp., New Rochelle, N. Y.

First vice-president—H. B. Hanley, American Laundry Machinery Co., Rochester, N. Y.

Second vice-president—A. C. Denison, Fulton Foundry & Machine Co., Cleveland, Ohio.

Secretary-treasurer—C. S. Nichols, Meehanite Metal Corp., Chattanooga, Tenn.

DPC Coal Mine Producing

Edwardsport, Ind.

• • • Production started recently at the DPC financed Shasta Coal Corp. mine here, and will soon reach a rate of 3000 tons per day.

Probably the only government financed coal mine in the midwest, Defense Plant Corp. sponsorship to the extent of \$1,400,000 was announced last February to put this stripper operation into production.

The Shasta organization officers are officials of the Binkley Coal Corp., which is both production and distribution agent for the new mine. Production was originally expected to begin Aug. 1, but several delays were encountered.

RESEARCH TESTS STEELS FOR PEACE IN THE CRUCIBLE OF WAR

In the train of vast tonnages and varieties of steel being produced in America for war, new and better steels for peace-time use will follow.

Because of the knowledge and experience gained through steel research and metallurgical development during the peaceful years, the steel industry was ready for war. It was prepared to produce quality steels quickly in overwhelming tonnages to help win the battle of supply and arm our forces with superior weapons and equipment.

The accelerated testing of steel in the crucible of war has enabled metallurgy and research to develop many tougher, better, more versatile steels that will open new avenues for enterprise and employment when peace comes.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

CONTROLLED QUALITY STEEL FOR WAR



COPYRIGHT 1944—JONES & LAUGHLIN STEEL CORPORATION



METALLURGY IN ACTION

How far will steel stretch and what "pull" can it take before it breaks in two, are facts important to quality control, quickly determinable by the tensile testing machine shown in illustration. Many other sensitive and intricate machines are employed today by the great force of trained steel research engineers and metallurgists in their work in laboratories and steel plants.

Better mortar due to metallurgist. The army had difficulties with field mortars, base couldn't stand the gaff, wore out before barrel. Young J&L metallurgist suggested trying special J&L-made armor plate for base. Ordnance worked it out. New base proved superior, even permitted greater powder charge, which lengthened mortar's range.

Miniature steel works, with small steel furnaces and rolling mills, is invaluable adjunct to department of research and metallurgy at J&L. In this pilot plant, first of its kind in steel industry, many important developments in steels were worked out before the war. Since the start of the war, a number of advancements in steel products were perfected here, put in production in J&L and other steel plants, contributed greatly to the arming and protecting of our fighting men.

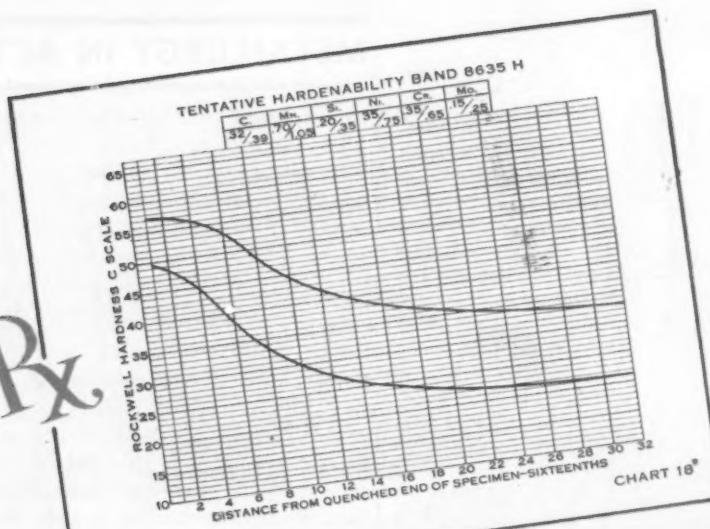
Steel armor rolled on J&L strip mills, for tanks, guns, planes, after Army Ordnance proved it under fire, was developed (1942) in J&L pilot plant, from a peace-time formula of metallurgical research. The basic formula was one that J&L metallurgy had successfully worked out for oil country steel obliged to take severest punishment.

Metallography, or microscopic examination of steel, was developed by Sir Henry Clifton Sorby in 1849, is routine practice today.

Ginger snap micro-photo was submitted in jest to late Prof. Albert Sauveur (1863-1939) dean of American metallurgists, because structure of cookie resembled Sauveur's experimental photos of mild steel under microscope. Despite joshing, Sauveur persisted in development of science of metallography, now universally in use in steel research, and was awarded Bessemer medal of 1924. He held chair of metallurgy at Harvard.

De Re Metallica, first scientific treatise on mineralogy and metallurgy, 20 years in preparation, profusely illustrated with woodcuts, was written in Latin and published in early 16th century by Georgius Agricola, pen name for Georg Bauer, a Saxon. The work, translated into other languages, was text book for several centuries. Recent English translation (1912) was made by Herbert Clark Hoover and wife, the late Lou Henry Hoover.

"**To arouse intelligent minds to action**" was stated purpose of another pioneer scientific author, Vannoccio Biringuccio. His *Pirotechnia*, published 1540, treated of mineralogy and metallurgy and sold 30,000 copies, a medieval best seller.



Rx HARDENABILITY BANDS are here!

Are you prepared to take advantage of them... for improving your product?



THE A.I.S.I. has recently approved 37 standard steels that can be purchased on a basis of precisely prescribed maximum and minimum limits of hardenability. Other standard steels, being investigated on the same basis of their capacity to harden both in degree and in depth during heat treatment, will likely be added to the list.

While the use of a hardenability standard is a big step forward in predetermining steel characteristics and response to heat treatment, it should by no means be considered a magic key to steel performance.

In other words, even though you buy steel to hardenability bands, that is no assurance that your heat treating equipment or methods will produce optimum results. If your heat treating practice is faulty or your equipment is inadequate you simply can't get out of the steel what the steel maker has put into it. In spite of the superior uniformity assured by Hardenability Band standards, you'll still have warpage, quench cracks, soft spots, poor machinability and higher costs than necessary.

Here at Tate-Jones we offer you thorough and practical knowledge not only of conventional heat-treating but of the most advanced heat-treating methods—Austempering, Martempering and Purnellizing. We can guide you in the application of the proper procedure indicated for your particular needs—and we can furnish the most efficient heat-treating and tempering equipment needed to give you the results desired.

Our technical staff of metallurgists, combustion engineers and furnace designers is prepared to work with you on any problems involving heat treatment. Their expert advice is based on 46 years experience building quality industrial furnaces and heat-treating equipment.

For better results in heat treating



TATE-JONES

& CO. INC. • LEETSDALE (Pittsburgh District) PA.

Rotating Hearth • Car Bottom • Pusher • Conveyor • Roll Down •
Horizontal and Vertical Pit • Circular and Rectangular
Pot Furnaces • Also • Gas • Oil and Combination Burners

NEWS OF INDUSTRY

Mack Preparing New Bus Model for 1945 Delivery Schedule

New York

• • • Production of a new Mack bus, scheduled for delivery in mid-1945, will get under way shortly, according to a recent announcement. Seating 41 passengers, it is designated as the C-41 and succeeds the CM model which Mack turned out before the war. The company states that its production will in no way interfere with Mack's regular output of heavy-duty trucks for the armed forces.

The new model embodies features that have been engineered through collaboration with bus operators, following research and experimentation on the part of the manufacturer. It has a 189½ hp. engine, driving through a hydraulic torque converter instead of manually controlled gears; a new heating and ventilation system; a new braking system, and better springs.

The entire powerplant compartment is completely sealed off from the riding space and heavily insulated against heat and sound. The six cylinder Mack Thermodyne engine is new and rated at 189½ hp. at 2200 r.p.m. and has a displacement of 670 cu. in. Improvements have been made in the engine intended to improve its adaptability to bus service. The hydraulic torque converter, a three-stage turbine, is bolted directly to the engine flywheel bell housing and drives the propeller shaft through a pair of bevel gears.

A marked advance in riding ease has been achieved without departing from the time-tried conventional form of springing. Front springs are 72 in. long and 4 in. wide of flat form and built up of two stacks of thin leaves arranged for smooth progressive action. The rear springs are 60 in. by 4 in., and both sets are suspended in Mack rubber shock insulators to reduce wear, rattle, adjustment, lubrication and replacement. The shock insulator cast steel housings are welded to the frame.

Inside and out, the new buses have been fitted with an eye to rider appeal. Mack gave its engineers considerable freedom, knowing that one of the major worries of bus operators today is how to hold on to a percentage of the rider gains made during the war years.



After the Ticker Tape...what?

The whistles will blow, the bells will toll—we'll shower them with ticker tape and tears of joy—then what?

Then the victory they've won and all the things they've fought for will be in our hands to hold... We have all the weapons we could want: Productive capacity, technical skills, buying power, and need. How, then, could we possibly fail?

Only by lack of planning now for total peace.

And in this critical hour of preparedness for peace, the engineers of the basic machine tool producers again have a strategic part to play.

They helped the men of government and of industry to plan the most desperate and gigantic production program of all time... and they can help those same men now to solve our post-war problems of reconversion.

One of these is a Bryant man. We offer his services to you.



GYANT CHUCKING GRINDER COMPANY

SPRINGFIELD
VERMONT, U.S.A.

COPPER COATED

Thomas' Ship
COLD ROLLED STEEL STRIP



ECONOMY IN PRECOATED STRIP STEEL

The illustrations demonstrate successful drawing, forming, brazing, and soldering operations with copper coated Thomas cold rolled strip steel. Profitable advantages of using this material include an aid to deep drawing, die lubrication, and greater die life. As a base for further plating, for its lustrous finish, or for corrosion resistance during fabricating operations, you will find this Thomas crackproof, peelproof finish reduces overall costs. Being precoated, Thomastrip provides a uniform coating on the inside and outside of parts, regardless of the complexity of the formation. To determine how this worth-while coating which offers many advantages, as illustrated above, will fit into your production, tell Thomas about your requirements.

BRIGHT FINISH NOT COATED, SOLDER COATED, ELECTRO-COATED WITH NICKEL, ZINC, COPPER, BRASS, AND LACQUER COATED — IN COLORS

THE THOMAS STEEL CO. • WARREN, OHIO
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

NEWS OF INDUSTRY

Air Conditioning Council Becomes Part Of National Group

Buffalo

• • • The Air Conditioning Council of Western New York, according to an announcement by W. E. Voisin, president, will become the first local chapter of Indoor Climate Institute. The formal induction ceremony will be held at the Buffalo University Club the evening of November 14th. The name of the local organization will be changed to Indoor Climate Institute, Western New York Chapter.

Mr. Voisin pointed out that the Air Conditioning Council of Western New York has been operating for eight years and has pioneered much of the same work that is being done by the Indoor Climate Institute. "Our members voted to join forces with the national I.C.I. in order to reinforce and broaden our public information and training programs," Voisin said.

Bison Shipbuilding Releases Workmen At End of Contract

North Tonawanda, N. Y.

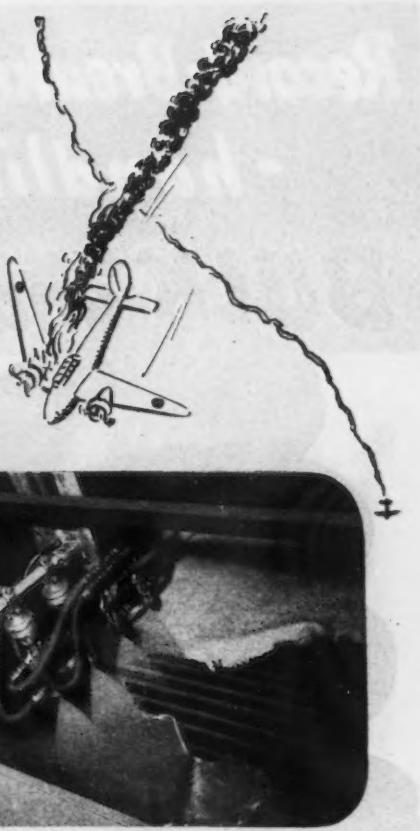
• • • The Bison Shipbuilding Corp. last week completed its Navy contract to build LCT invasion barges with the launching of the 341st of these craft and released 625 of the yard's 700 men, mostly skilled workers.

Vice-President Earl A. Jung announced that about 75 men are being retained to prepare parts and accessories for shipment to LCT bases.

"This winds up our contract," Mr. Jung remarked. "It looks like the Navy has all the LCT's it needs at this time."

Bison Shipbuilding was formed in the spring of 1942 by the Ernst Iron Works and August Feine & Sons of Buffalo. Steel for the craft was fabricated by these concerns and the boats were assembled at the Bison Yard. The company has always been ahead of its schedules, according to an official, and the last LCT was not scheduled by the Navy for launching until Nov. 29.

In addition to LCT's, the company also had turned out about a dozen bomb and torpedo-carrying barges. At the peak of its activity, the yard employed about 1300.



U. S. Army Air Forces Photo

WE KNEW HIS WARDROBE WHEN IT WAS ONLY LITTLE SHEARLINGS!



Even though it's sub-zero weather up where our bombers fly above the enemy, those waist gunners are in a mighty hot spot when Axis fighters close in to make their challenge!

For protection against enemy shrapnel and bullets, they wear "flak" aprons. For protection against the frigid weather, they wear electrically-heated boots and gloves and several layers of sheepskin flying clothes. That's where we came in!

Before the small sheepskins (shearlings) can be fabricated into flying clothes, they must be coated on one side with acrylate resin material to make them resistant to weather and perspiration. Up in Norwood, Massachusetts, Winslow Bros. and Smith were asked to "up" their production of processed shearlings. Under their former method the maximum production of an eight-

man crew was 1200 a day. After the installation of a DeVilbiss automatic spray system (inset above), a four-man crew averaged 4000 a day!

An unusual wartime application, yes . . . but no unusual saving in time and labor. In countless branches of war production DeVilbiss spray equipment—both automatic and manual—has contributed to Victory by achieving startling speed-ups in the coating and painting of war materiel. To get the benefit of such important savings in your peacetime production, let us send an engineer to analyze your individual post-war requirements, now. From the four related DeVilbiss lines—spray equipment, exhaust systems, air compressors and hose and connections—he can provide a complete spray system of products designed to work together for maximum speed and efficiency.

THE DEVILBISS COMPANY, TOLEDO 1, OHIO
Canadian Plant: Windsor, Ontario



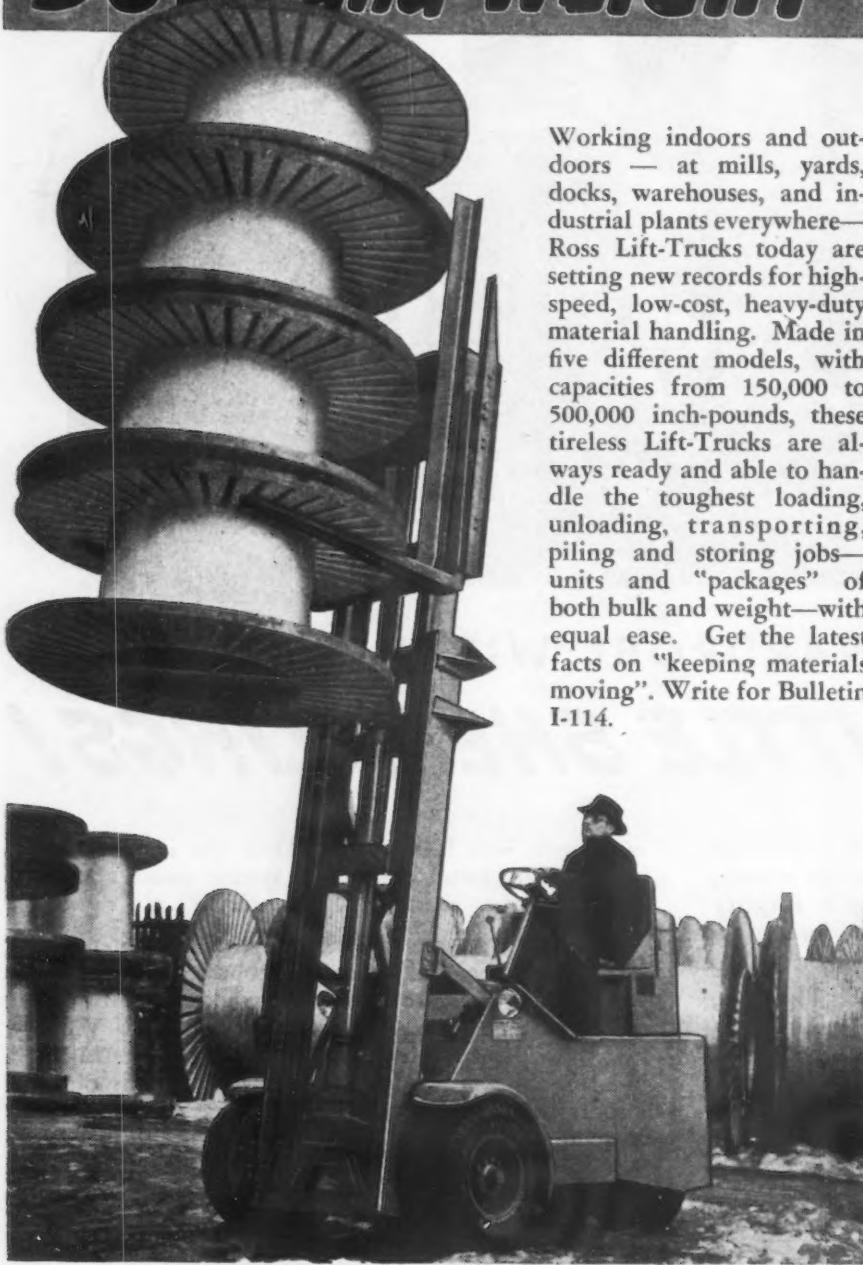
DE VILBISS

Spray Systems

SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS

Record-Breaking Performance - handling both

BULK and WEIGHT



Working indoors and outdoors — at mills, yards, docks, warehouses, and industrial plants everywhere — Ross Lift-Trucks today are setting new records for high-speed, low-cost, heavy-duty material handling. Made in five different models, with capacities from 150,000 to 500,000 inch-pounds, these tireless Lift-Trucks are always ready and able to handle the toughest loading, unloading, transporting, piling and storing jobs — units and "packages" of both bulk and weight — with equal ease. Get the latest facts on "keeping materials moving". Write for Bulletin I-114.

The ROSS CARRIER COMPANY, Benton Harbor, Michigan

Branches: Seattle—Portland—San Francisco—Vancouver, B. C.—New York City—Hoboken, N. J.

ROSS

HEAVY DUTY

MATERIALS-HANDLING

EQUIPMENT

BENTON HARBOR • MICHIGAN

NEWS OF INDUSTRY

Russia Utilizing Recently Developed Coal Fields for All Needs

London

• • • Although supplementary mine fields are supplying sufficient coal for most urgent needs, Russian coal fields that were the country's largest producers before the war have not been rehabilitated, according to information received here.

The Donbas region, which before the first World War was producing as much as 87 per cent of Russia's coal was found completely demolished when the territory was recaptured this year from the Germans, and will require a tremendous amount of work before the mines are again producing in quantity. The work is complicated because in addition to wrecking the mines, the Germans destroyed all types of industry in the area. Thus, work in pumping the hundreds of millions of gallons of water from the mines is delayed by a lack of power generating machinery and adequate pumping machinery, which was also completely destroyed.

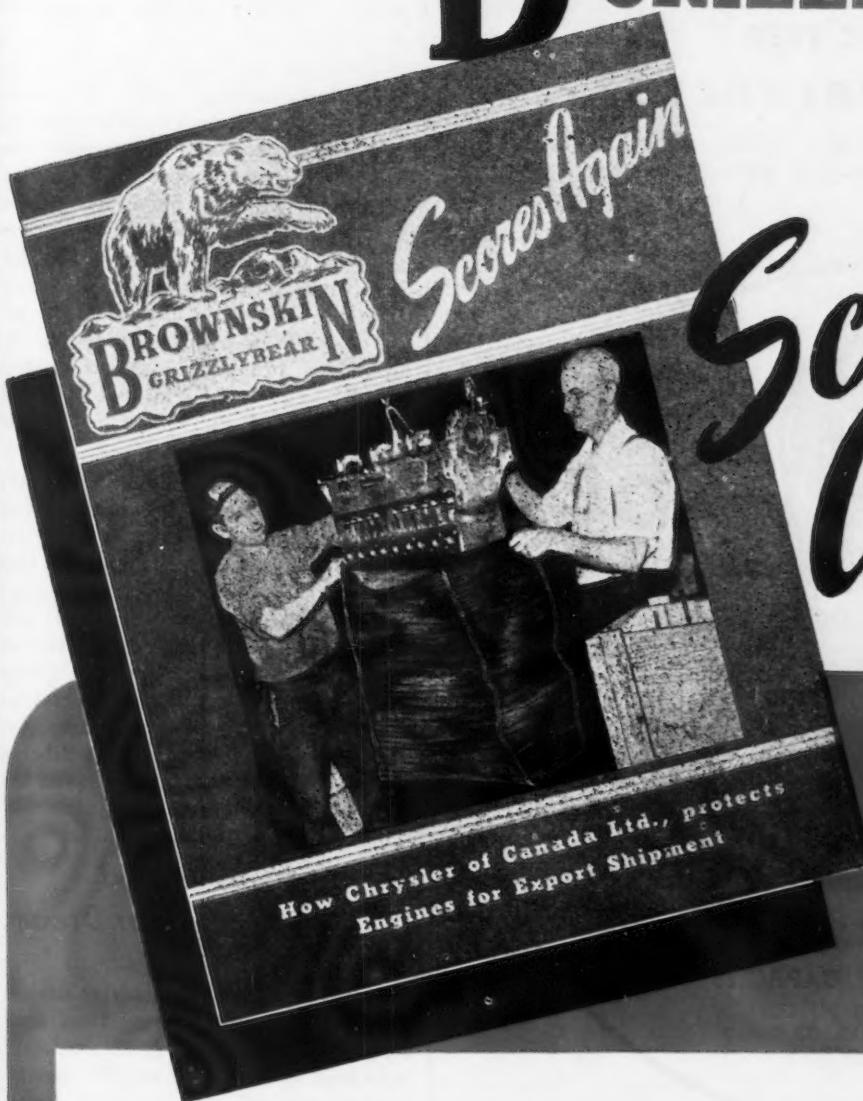
Barring the Soviet Union's prodigious efforts during the years between the wars, that country would now be lost without the Donbas coal. However, one of the prime efforts of the several five-year plans was the development of coal resources, known to be approximately 20 per cent of the world's supply, second only to those of the United States. Until the time the Czar was overthrown, Russia had always imported coal, despite this great undeveloped potential. Lenin, however, had very special views on the nation's need for coal, and hastened to put them into practice.

In addition to a need for additional mines, and more productive mining efforts, one of the basic difficulties was the uneconomic transportation requirements resulting from producing most of the coal many hundreds of miles by rail from the industrial centers. This placed a very severe strain on the limited rail facilities, and was an important factor in the eventual downfall of the Czar's regime.

The new Russian Government then took steps to develop the widely scattered deposits of low grades of shale and brown coal, not as valuable as those being mined, but suitable because of their proximity to the need.

Covering the period of the five-year plans, great numbers of such small mines were opened up for local

BROWNSKIN GRIZZLYBEAR N



Scores Again!

This colorful illustrated folder tells the experience of the Chrysler Corporation of Canada Ltd. Would you like a copy? It's free.

BATTLE AGAINST THE ELEMENTS — Chrysler Corporation of Canada Limited was faced with this problem of . . . "Corrosion and other deteriorating agencies, making it impossible to transport finished motor parts to the fighting fronts, ready for immediate installation and use."

ANGIER versus CORROSION — Angier Corporation engineers cooperated in the solution of the problem. After studying all the phases of it they recommended A-19 BROWNSKIN GRIZZLYBEAR.

RECOMMENDATION ACCEPTED — Angier scores again and again with its Corrosion Preventive and Waterproof Papers which have revolutionized the packaging of finished steel and precision parts delivered to the war theatres throughout the world.

WRITE FOR FREE FOLDER BIA

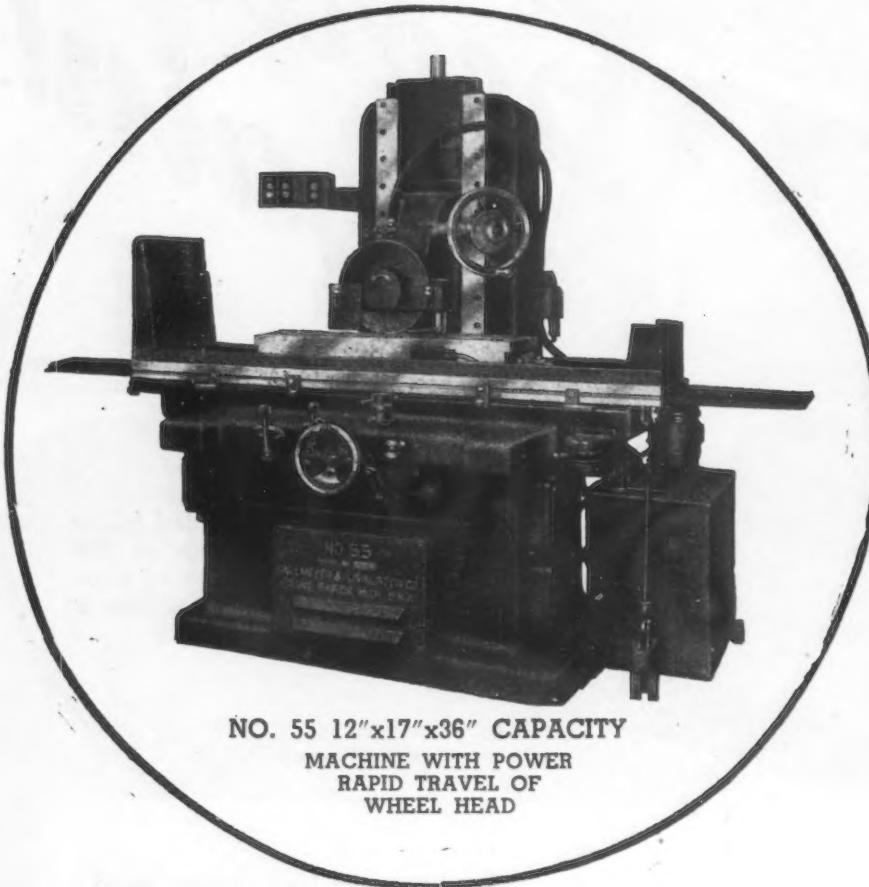
ANGIER CORPORATION
CORROSION PREVENTIVE AND WATERPROOF PAPERS
FRAMINGHAM, MASSACHUSETTS



GRAND RAPIDS

HYDRAULIC FEED SURFACE GRINDERS

ARE MEETING THE MOST EXACTING NEEDS OF ARMY, NAVY AND AIR CORPS CONTRACTORS WHERE EXTREME ACCURACY IS REQUIRED ON PRODUCTION JOBS.



THESE GRINDERS FEATURE

ONE PIECE COLUMN AND BASE CASTING
PATENTED MOVEMENT OF WHEEL HEAD
BIJUR ONE SHOT LUBRICATION
TWO USABLE SPINDLE SPEED
PORTABLE MOTOR DRIVEN COOLANT SYSTEM
LONGITUDINAL TABLE SPEEDS UP TO 125 F.P.M.

If you are interested in surface grinders which combine tool room accuracy with production speed, send for Bulletin G-L 100 today.

GALLMEYER & LIVINGSTON CO.
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GRAND RAPIDS 4 MICHIGAN

supply in the Urals, the Caucasus, Central Asia, Siberia and the Far East. Shale workings were started around Leningrad and the Volga. These were all areas which had formerly depended on fuel transported long distances.

Measures were also taken to increase production in a few areas where operations had been in progress on a limited scale. For example, production in the Moscow area was increased 27 per cent before the second war began, and increases in some other areas were higher. The aggregate output for local coal operations in the period increased 32 per cent, and their ratio compared to the total coal production increased from 10 to 22 per cent. The last five-year plan, up to 1942, was scheduled to increase this figure to 40 per cent.

Development of industry in the eastern regions of the Soviet after 1930 at Stalin's direction was responsible for the emergence of the Kuzbas region as the second largest coal producing area in Russia, and one of the truly great coal centers of the world. It was to provide coking coal for the iron and steel industries of the Urals and Siberia, and to supplement local coal supplies of Siberia, Central Asia, the Ural and even the Volga region.

Designers Defended On Postwar Dreams

New York

• • • Criticism of industrial designers efforts in planning postwar models of all types of goods radically advanced over prewar models was attacked recently by Egmont Arens, industrial designer, at a meeting of the packaging group of the American Marketing Association at the Hotel Sheraton.

"In my opinion," Mr. Arens said, "there is no doubt that the 'dream designing' misnomer will backfire. Manufacturers who dream that all they need to do is get out the old dies and start stamping are due for a rude awakening."

There is going to be a huge backlog of demand for these so-called dream designs, he stated.

"For every manufacturer hoping for before the war normalcy there are ten who are awaiting the opportunity to jump into the market with new products," Mr. Arens asserted, "developed during the war or along the lines of production techniques developed during the war."

Helping overcome aluminum
addition problems in basic steels.

Simanal

• 20% SILICON • 20% MANGANESE • 20% ALUMINUM

SIMANAL ADVANTAGES

- Controls Alumina, Silica, and Alumina Silicate inclusions by introducing Manganese Oxide.
- Produces globular inclusion.
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FERRO-SILICON 50%, 75%, 85%, 90%

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The use of straight aluminum in deoxidizing of certain steels has not always produced desirable grain structures or well-distributed inclusions. But a ferro-alloy of 20% each Silicon, Manganese, and Aluminum called Simanal has solved many steelmakers' problems of aluminum addition and given improved control of grain structure and inclusions.

Simanal may be ideally adapted to your requirements. The Ohio Ferro-Alloys Corporation will be pleased to assist in your test application.

* Especially advantageous where medium carbon ferro-manganese is required.



Ohio Ferro-Alloys Corporation
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Chicago Detroit Pittsburgh San Francisco Tacoma

**Proposed New British
Injury Compensation
Plan Awaits Action**

London

• • • The British Government has recently published a proposed revision in the system for handling compensation for worker's industrial injury compensation. If the new decree is approved by Parliament workmen's compensation will be treated in the future not as a part of the law of employer's liability, but as a part of the regular social service program.

The new order explains that for half a century compensation has been a part of the employer's responsibility by law. Under this system it has been open to him to insure himself—and in some cases, he is required to do so. It has been the workman's responsibility to file his claim, and enforce it in court of law if challenged. Such a system has made these claims a disputable issue, and has led to the development of paying off in a lump sum, for simplicity's sake on both sides. Under the new system, as a part of the extension of the social insurance system, the government will handle such cases, under the Minister of Social Insurance.

Benefits at a flat rate will be paid from a separate insurance fund with the employee, employer, and the government contributing. Under the former system, benefits were related to the estimated loss of earning capacity. The new flat rate system will be supplemented with allowances for family responsibilities. The pension will not be affected by any future earnings and will not be replaced by a lump sum payment, except in cases of very minor disablement.

The fund will be maintained by weekly contributions from employers and workmen collected by stamp, with a contribution from the Exchequer. The weekly rates of contribution will be 12c. for adult men and 8c. for women, to be shared equally between the employer and workman. The rates for juveniles will be half these rates. Benefits will not depend on a contribution qualification. The contributions will not be payable when the workman is incapacitated for work or unemployed.

An incapacitated workman will be paid an industrial injury allowance of \$8.50 a week for up to 13 weeks, with allowances of \$2.12 for a wife and \$1.21 for the first child. Other children will receive family allowances at \$1.21 each. Where the disablement is like-

**SOUTH SEAS BOUND
BRUISERS**

**...OR
1½ TON
TRUCKS**

PLACED ALTERNATELY on this chassis line are heavy-duty trucks destined for the steaming hells of South Sea islands and the peaceful, yet rigorous, duties of delivering furniture, fruit and fabrics to folks here in the United States.

**Handled More Efficiently On An
A-F Engineered Conveyor System**

DESIGNED to move 1½ ton trucks at the most efficient production speed, this A-F Conveyor System took on the indoor transportation of heavy duty army trucks for the U. S. Naval Forces placed alternately with trucks for domestic use. It is now engineered to allow for 8- and 9-ton trucks . . . If your plant has a product handling problem, why not let A-F Engineered Conveyors help you solve it? Write today.

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CONVEYING EQUIPMENT

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METAL PRODUCTS CLEANING & FINISHING EQUIPMENT



Cold-formed of Stainless Steel in the USA



Watch case (bezel) of Rustless stainless steel, 18-8, Type 304, for the armed services. Made by blanking and cold-forming by the Keystone Watch Case Division.

THIS is one of the first all-stainless watch cases to be made successfully in the United States, proving that when necessary we can equal or exceed the best foreign techniques. The steel is Rustless 18-8, Type 304. Naturally, it is extremely corrosion-resistant clear through; no amount of wear can change that. It was readily fabricated by severe cold-forming operations, and was easily given an attractive, silvery-bright finish. Its hardness resists deformation and denting. And — very important for a watch — it is non-magnetic, even after cold-working.

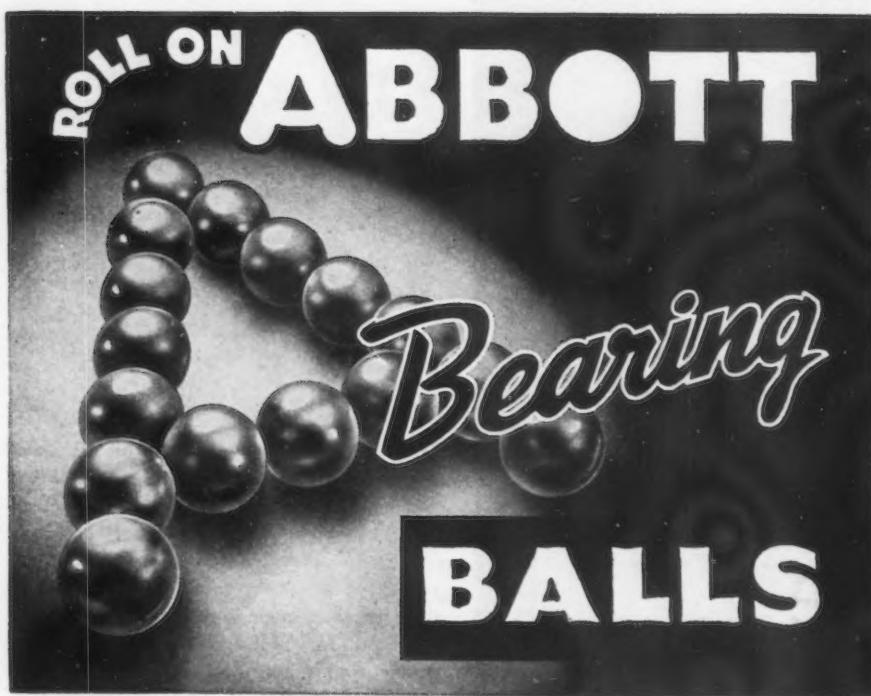
This success story goes back a number of years, because Rustless was a pioneer in working out the proper metallurgical formulas and physical conditions for cold-forming 18-8 stainless, starting with wire for cold-upset screws, and soon supplying material for other severe operations such as blanking and spinning.

Type 304 is but one of many variations of 18-8 stainless. If you have a product requiring severe cold-heading or other cold-forming operations, get in touch with us. We know the proper ratios of constituents, correct temper, and what special coating should be supplied, if necessary. When war conditions made necessary the production of an all-American stainless steel watch case, we were ready. Have you a cold-forming problem in stainless? . . . Rustless Iron and Steel Corporation, Baltimore 13, Maryland.



Producing
STAINLESS STEELS
Exclusively

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CHICAGO • CINCINNATI • CLEVELAND
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**IN
POST-WAR PLANS, too!**

Specify "ABBOTT BEARING BALLS!"

Around these unseen parts will be built the successful new ideas, now in the blueprint stage, for tomorrow's vast markets.

These load-carrying jobs of the future will demand uninterrupted performance—the performance assured with ABBOTT BEARING BALLS in the assemblies.

The swing to "ABBOTT" is the result of consistently high standards of quality in materials and workmanship. It's the ABBOTT 35th year as bearing ball manufacturers. All types of industries know when they specify "ABBOTT BEARING BALLS" their load-carrying problems are solved—and successfully.

You, too, may confidently specify "ABBOTT BEARING BALLS" to fulfill your every requirement in today's Post-War plans.



CARRY THE LOAD AS PLANNED

ROLL ON ABBOTT Bearing BALLS
THE ABBOTT BALL COMPANY HARTFORD 10, CONN. U.S.A.

NEWS OF INDUSTRY

ly to be permanent or prolonged it will be replaced by an industrial pension assessed according to the degree of disablement. The pension for 100 per cent disablement will be \$9.72 a week. In addition, with the maximum pension, \$2.43 a week will be paid for a wife and \$1.82 a week for a first child. If the pensioner is virtually unemployable his pension will be supplemented by a personal supplement of \$2.43 a week; and if he needs constant attendance a special allowance of \$4.86 a week will be payable. Where the pension is payable at less than the 100 per cent rate allowances for a wife and first child will be proportionately reduced. If no wife's allowance is payable there will be an allowance at the same rate in respect of one dependent. The injury allowance of \$8.50 will be raised to the maximum pension rate of \$9.72 at the end of the 13 weeks if no pension rate has been previously assessed.

Once a final pension is awarded it cannot be altered and no account will be taken of any subsequent earnings.

**Steel Construction
Men See Big Demand
In Postwar Period**

Atlantic City

• • • Members of the American Institute of Steel Construction, the makers and builders of skyscrapers and bridges, foresee steady employment and no reconversion problems in this industry after V-E Day, Robert T. Brooks, executive vice-president, said at the opening of the annual meeting of the Institute here recently.

Brooks said that scores of public and private projects requiring the employment of millions of workers are ready to be undertaken as soon as Germany is defeated. He said these projects had been delayed four years by the war.

Citing recent press releases by J. A. Krug; chairman of the War Production Board, Brooks said that "encouraging reports have been coming out of Washington lately, indicating a desire to turn business back to private initiative as soon as it becomes practical."

"Since 1940," Brooks said, "the structural steel fabricating industry has accomplished two war jobs. The first was the construction of the nation's war plants. The second was the construction of landing craft and a wide variety of other steel products

Sulphite-Treated Alloy and Special Steels

BENEFITS TO USERS

- ✓ 25% Greater Machining Speed
- ✓ 200% Longer Tool Life
- ✓ Fewer Rejections
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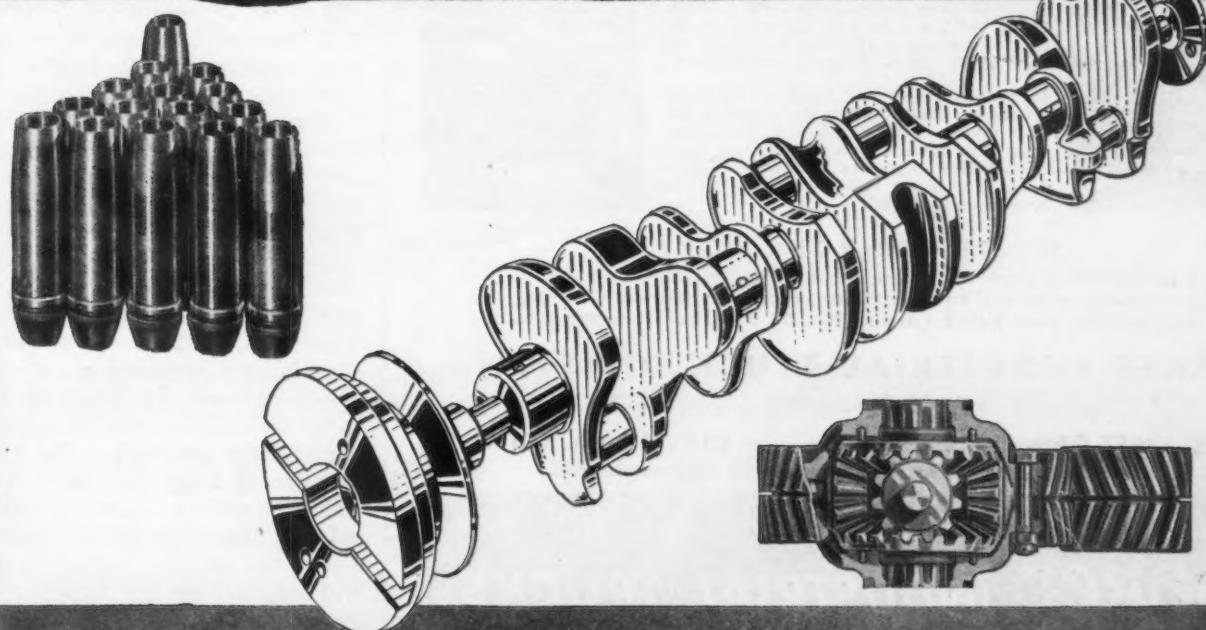
SULPHITE-TREATED alloy and special steels, which we have produced for a number of years, have solved many problems for steel users. They have been most satisfactorily applied where machinability is of first importance.

Sulphite treatment can be applied to most types of steel. It has been used successfully in the production of shells, crankshafts, camshafts, axles, and gears.

If you believe that your company may have an application for sulphite-treated steels, our sales and metallurgical staffs are at your service. We have accomplished satisfactory results for others and are ready to serve you in the same way.

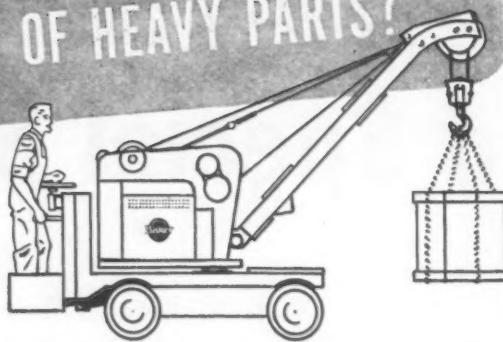
WISCONSIN STEEL COMPANY

Affiliate of International Harvester Company
General Offices: 180 North Michigan Avenue, Chicago 1, Illinois



Is your problem one of-
YARD STORAGE OF HEAVY PARTS?

Because of their trackless flexibility, Baker Trucks are ideal for yard handling of material, making remote locations available for storage of heavy parts. Your problem may be similar to one of the case histories listed below. Many others are reported in the New Baker Catalog.



One of the largest suppliers of bombers, fighters and training planes to our armed forces uses a Baker Hy-Lift Truck with die-pulling winch for changing heavy dies on their drop forge hammers and storing these dies in the factory yard. Time consumed moving dies from yard to machines is kept at a minimum, reducing idle machine time. (Left)

The Baker Crane Truck (Right) is handling a machine bed 8½ ft. long in the yard of a large machine tool manufacturer. This company also handles many longer and heavier beds—even beyond the capacity rating of the crane, by pulling them on a dolly placed under one end.

In the supply yard of a large electric utility, a great variety of materials are handled daily by a Baker Crane Truck. No job is too small, none too large for this truck. Maneuverability and accurate control make it ideal for yard operations where congestion complicates handling and where space must be utilized efficiently. (Left)

With every available square foot of inside floor space needed for production, a manufacturer of punch presses found that a Baker Crane Truck solved his problem by making possible yard storage of heavy press frames, castings, dies and other material. Truck is also used for a wide variety of handling operations inside the plant. (Right)

Awkward-to-handle material like castings, lengths of heavy pipe or rods are quickly available from yard storage with a Baker Crane Truck on the job. The truck at the left is handling large motor frames in the yard of an electrical motor manufacturer.

In railway supply and repair yards, crane trucks are indispensable for handling the wide variety of heavy, bulky parts—moving them from storage areas and spotting them for assembly to cars or locomotives. Baker Crane Trucks are also used extensively in roundhouses. (Right)



WRITE FOR YOUR COPY

Plant and production managers, traffic managers, superintendents, purchasing agents and any others concerned with material handling will find the new Baker Catalog No. 52 a valuable reference.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company

2175 WEST 25th STREET • CLEVELAND, OHIO
In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

for almost every type of war task.

"Through the past year, we have maintained a tonnage of war material equivalent to the peak peacetime years of our industry.

"If Congress completes the passage of bills providing for \$950,000,000 per year in appropriations for public construction, and if the states match these with similar funds, a backlog of \$1,900,000,000 in public construction funds will be available to begin the task of reconstruction immediately after the war in Europe ends.

"We have every reason to believe that this industry will be more than ready to supply its share of postwar employment."

R. R. Wason, president of Manning, Maxwell & Moore, Inc., told delegates that there is a 12-year backlog of uninvested money and unbought goods in America. Watson said that a free exchange of services and goods would free investment capital and create jobs for all Americans who want to work.

Common Thread Standards Studied by U. S.-British Group

Washington

• • • Progress is reported in the setting up of a common standard of screw threads between the U. S. and Great Britain. The existence of two different systems, one with a 60 deg. thread angle and the other with 55 deg., and one with sharp corners and the other with radii at the crests, and in particular with different numbers of threads per in. for some sizes, has caused considerable difficulties in the production of equipment for common use in the prosecution of the war.

Toward such an end a conference was recently held in London under the auspices of the British Standards Institution. It was attended by a joint mission from the United States and Canada, setup by the Combined Resources and Planning Board, the Anglo-American-Canadian economic high command. The visiting mission was headed by Elmer J. Bryant, chief of the gage division, Greenfield Tap & Die Corp., with J. G. Morrow of Canada as vice-chairman. Considerable progress was reported by CRPB in the formulation of recommendations for common standards. The general question of design and drafting procedure, including limits for cylindrical fits also came under discussion. Before the month is out a full report will be made by the American committee.

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20 CYLINDER BLOCKS MILLED AUTOMATICALLY EVERY HOUR

Eight surfaces on two sides of a cylinder block are finished automatically with this Cross Special Milling Machine.

The work is loaded and clamped and the automatic operating cycle is started with an electric push-button centralized at the attendant's station. A cutter on one side of the cylinder block mills the manifold and valve cover faces. After the work progresses to a pre-determined position, the multiple cutter head advances transversely into cutting location on the opposite side. As the work-table continues in feed, the multiple cutters finish 2 angular and 5 straight bosses in 3 different planes and then automatically retract. Power rapid traverse automatically advances the table to the unloading station when the valve cover face is finished.

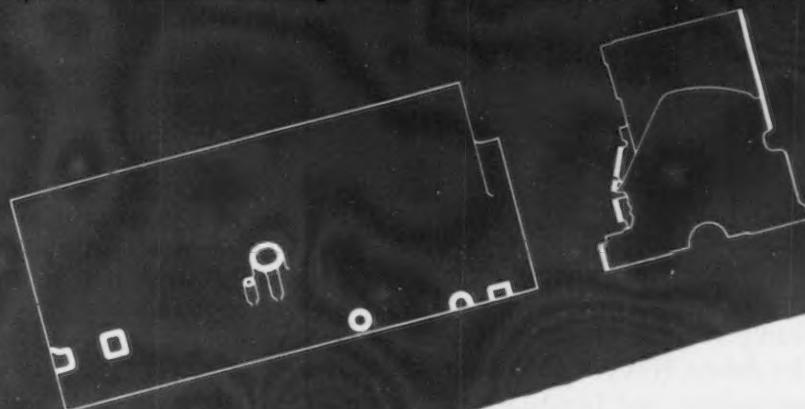
Cross Special Machines are engineered for

automatic operation and in most instances perform two or more turning, milling, tapping, reaming or grinding actions either simultaneously or in continuous performance at the push of a button.

Post-war production faces a price problem. Cross Special Machinery will preserve your profit in the face of reduced prices by combining a multiplicity of operations in a single automatic machine that eliminates work handling and the need for skilled labor.

Cross offers a complete Production Engineering Service to survey your work and recommend improvements for lowering your manufacturing costs.

A new Cross Catalog contains 35 detailed case histories of successful Cross Special Machines. For your copy, write on your letterhead to THE CROSS COMPANY, Detroit 7, Michigan, Dept. 72.



8 surfaces on 2 sides of Cylinder Block milled in 3 minutes—Automatically.



SPECIAL MACHINES

for automatically performing any one or a combination of metal cutting operations
TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

S-14



Illustration courtesy of Diamond T Motor Car Company

It shouldn't take much longer!

• American boys and their allies are pouring it on.

It shouldn't take much longer to finish off the Nazis.

But until Washington gives the word, the ACCO Giant has got to keep turning out chains for war needs ahead of civilian and commercial.

You can't imagine all the places chain is needed by Army, Navy, Coast Guard, Maritime Commission, and Lend-Lease. The picture above is an example. But we know that you need chain, too. And we'll be happy when we can serve you promptly again.

Oh, what a beautiful morning that will be!



In Business
for Your
Safety



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York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles,
New York, Philadelphia, Pittsburgh, Portland, San Francisco

AMERICAN CHAIN & CABLE
BRIDGEPORT • CONNECTICUT

NEWS OF INDUSTRY

General Motors Makes Third Quarter Report Covering War Goods

New York

• • • Deliveries of war products by General Motors in the third quarter of 1944 amounted to \$923,322,883, bringing to \$2,964,723,350 the total for the first nine months of the year, it was announced by Alfred P. Sloan, Jr., chairman, in his quarterly report to the more than 420,000 stockholders of the corporation.

"The continued high volume of General Motors' war production reflects the intensification of the Allied offensives," Mr. Sloan stated.

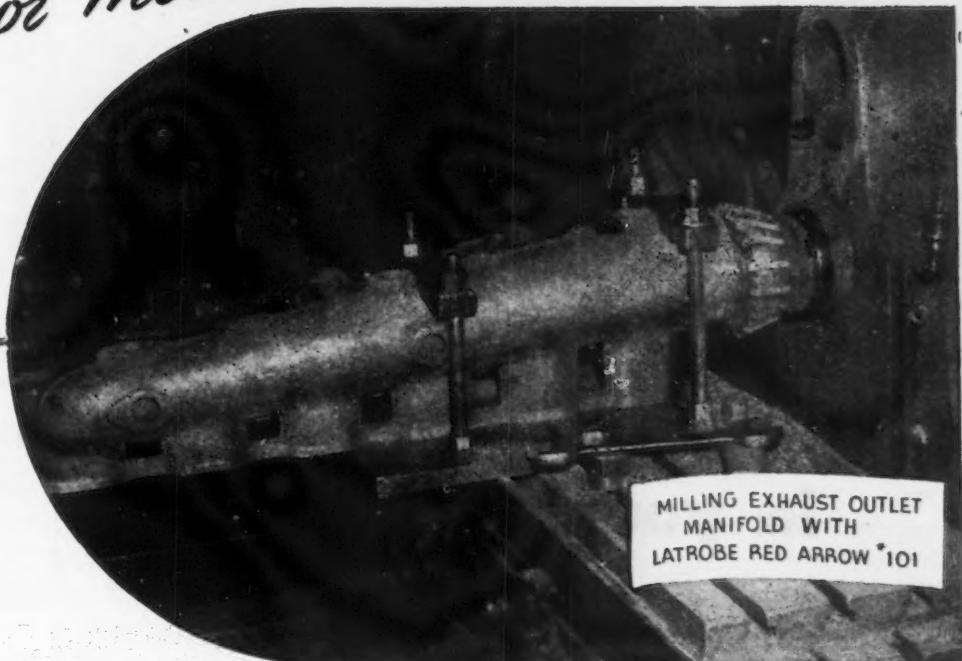
"Meanwhile, the need is recognized to plan for partial, and ultimately complete, reconversion of facilities for peacetime production and jobs. As the military situation permits, engineering talent and materials will be directed to this very essential job of preparing to meet the problems of postwar production."

Net income, after providing for taxes in the amount of \$62,877,000, for the third quarter of 1944 amounted to \$42,227,409, compared with \$40,129,260 for the same quarter a year ago. After paying the regular quarterly dividend of \$2,294,555 on the \$5 series preferred stock, there remained in the quarter under review net income of \$39,932,854 available for the common stock. This was equivalent to 90c. per share on the average number of common shares outstanding. For the corresponding quarter of 1943, net income available for the common stock amounted to \$37,834,705, equivalent to 87c. per share of common stock.

Net income, after providing for taxes in the amount of \$202,765,000, for the first nine months of 1944 amounted to \$124,997,304, compared with \$109,519,455 for the first nine months of 1943. After paying regular dividends of \$6,883,665 on the \$5 series preferred stock, net income available for the common stock for the first nine months of 1944 amounted to \$118,113,639, equivalent to \$2.68 per share on the average number of common shares outstanding during the nine-month period. This compares with \$102,635,790 for the first nine months of 1943, equivalent to \$2.36 per share of common stock.

Have you tried
LATROBE
RED ARROW →

-The Superior Cast Alloy
for Metal Cutting Tools



Requires no heat treatment

Easily brazed to tool body

Ground with ordinary wheels

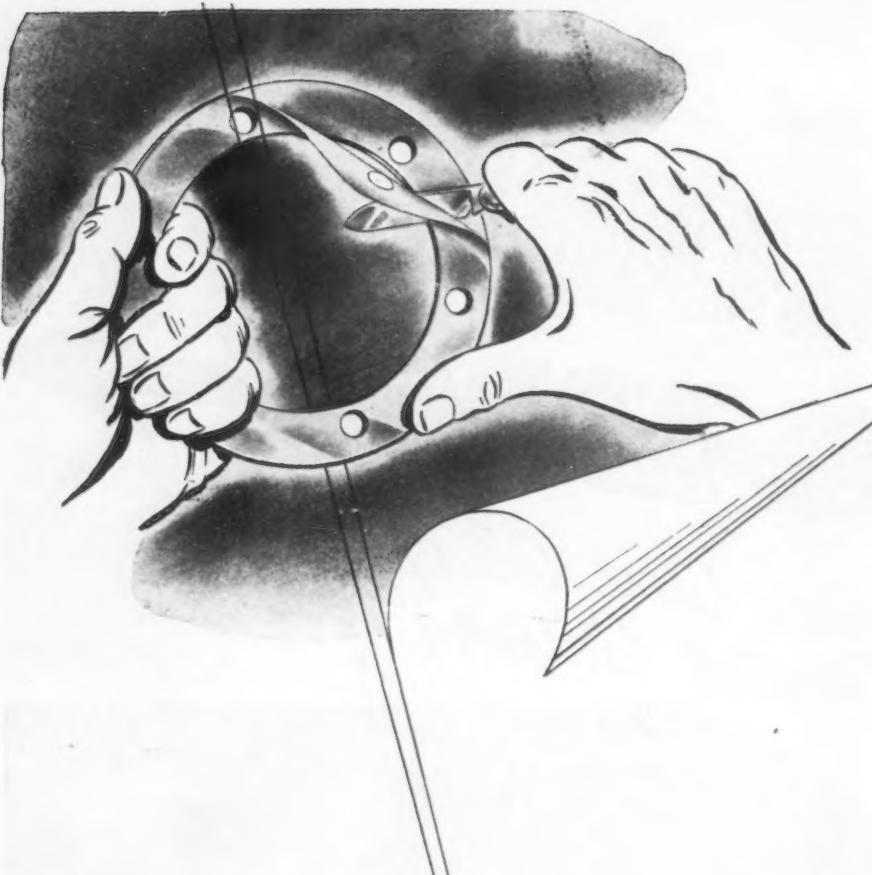


LATROBE RED ARROW Cast Alloy Cutting Tools operate most efficiently in that "intermediate cutting range" between high speed steel and tungsten carbide. Cutting tools cast from these alloys make important savings possible—*more pieces per grind, higher speeds and feeds, better surface finish!*

Standard sizes of Tool Bits carried in warehouse stocks.

Latrobe ELECTRIC STEEL COMPANY

MAIN OFFICES and PLANT • LATROBE • PENNSYLVANIA



Keep accuracy of MACHINE SERVICING in your own control

IF THE PERFORMANCE of the equipment you build hinges upon accuracy of service adjustments, consider protecting yourself by utilizing Laminum shims in original assembly.

Time-taking machining is saved. And proper servicing provided for. Good insurance. Your request for data invited.

Laminum shims are cut to your specifications. For maintenance and repair work, however, shim materials are sold through industrial distributors.

Laminated Shim Company, Incorporated
76 Union Street • Glenbrook, Conn.

LAMINUM
THE SOLID SHIM THAT *peels* FOR ADJUSTMENT

NEWS OF INDUSTRY

Sees Postwar Lift For Building With Emphasis on Design

New York

• • • Predicting a postwar boom in industrial construction, Charles Herman, president of the Charles Herman Contracting Co. of New York, said recently that after the war the emphasis in industrial plant design will be toward flow of materials, increased efficiency in the handling of materials, thereby reducing costs and increasing production.

This trend in construction is already beginning among some smaller industrial plants, he said, and will blossom into a full-fledged boom after the war when construction materials become more generally available.

According to Mr. Leon C. Laub, vice-president of the firm, the preponderance of construction will be in the smaller industries.

"Hundreds of smaller businesses," he said, "not only in New York but throughout the country, are housed in obsolete buildings, which today are mere shells.

"Their business has expanded with little or no regard to the physical set up of the plant. They might need a new machine for example. Looking around, they find no immediate spot for it, until someone says 'Let's jam it in over in the corner,' so it is jammed in, and there it stays.

"The result is inefficiency. American manufacturers have the most modern equipment, much of it is designed by themselves to meet their needs, but the physical plant has not kept pace with the industry itself.

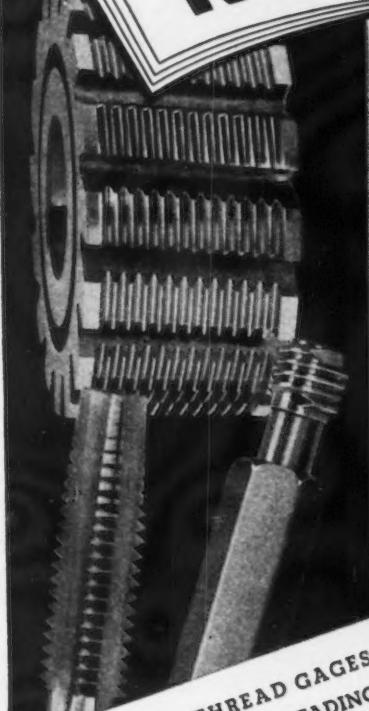
"Recognizing this, those firms which can get priority on materials are already reconditioning their plants. Others will build new ones after the war so that the flow of materials into a plant and through the various stages of manufacture will attain maximum efficiency and economy."

This reconditioning program, out of which will stem employment and the use of millions of dollars of construction materials, will extend everywhere.

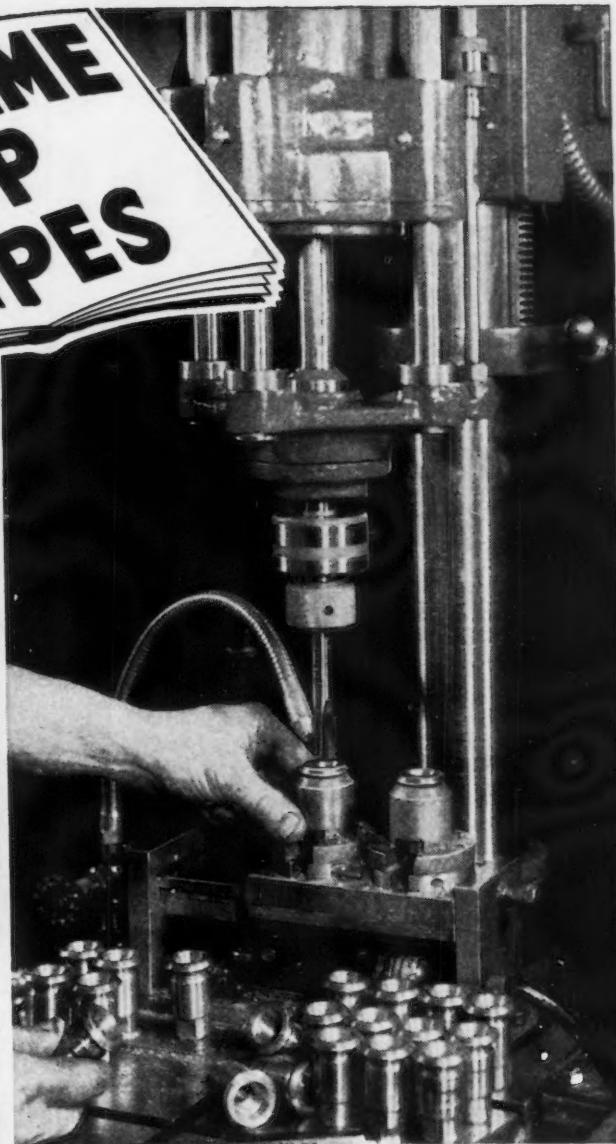
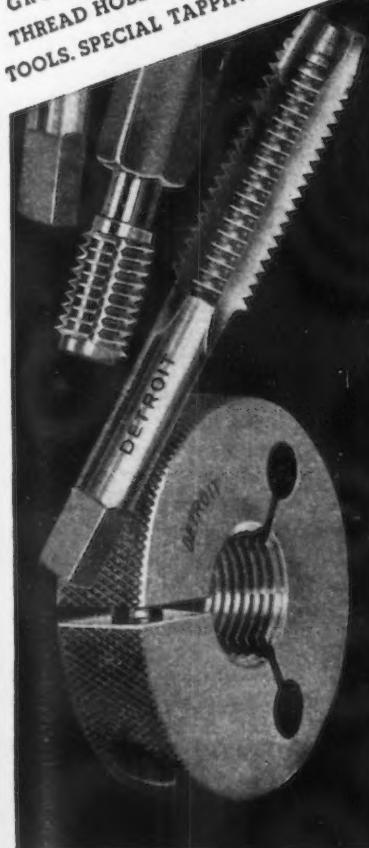
Allis-Chalmers Reports

• • • A net profit of \$2,654,384 has been reported by Allis-Chalmers Mfg. Co., Milwaukee, for the quarter ended Sept. 30, compared to \$2,697,947 for the third quarter of 1943. Net income for the first nine months of 1944 was \$6,782,605. For the first nine months of 1943, net income was \$6,186,133.

WAR-TIME SHOP RECIPES



GROUND TAPS, THREAD GAGES,
THREAD HOBs & SPECIAL THREADING
TOOLS. SPECIAL TAPPING MACHINES



Continuous
Precision
Tapping
with

DETROIT

light
duty tapping
machine
and simple
manual
fixture

Tapping 3/4 inch 16 NF threads 1-1/4 inches deep (Class 3 Fit) in a blind hole takes less than 10 secs. per part in continuous production on this "DETROIT" LTM lead screw tapping machine.

Virtually eliminated rejections. Drive to tap is taken off base of lead screw eliminating wind-up effect.

High production rate achieved made additional machines unnecessary to maintain required production.

Other features of the "DETROIT" Light Duty Tapping Machines include:

- Adjustable tapping head.
- Full length triple tap-spindle guides.
- Three selective spindle speeds.
- Multiple disc friction clutch reduces tap breakage.
- Lead screw is hardened and ground. Two-piece bronze nut. Completely enclosed. Quickly interchangeable.

For complete information ask for Bulletin #LTM-44.

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STAMPS

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TAP & TOOL CO.

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Hard-Faced Conveyor Rollers



Roll On and On!

Whether on rollers and discs of conveyors handling projectiles, shell cases or bombs, or on other machinery and equipment parts that are subjected to severe service, Coast Metals Hard-Facing provides a protective coating that resists wear and defies hard use and abuse.

Easily applied by standard welding techniques, Coast Metals Hard-Facing can be successfully used on any ferrous metal, including manganese steel, alloy steel, cast iron and chilled iron. Worn parts are quickly rebuilt to original dimensions and made good as new. In fact, such hard-faced parts are made better than new, since they last several times longer. For this reason, many companies today are hard-facing even new parts, and so getting the advantage of hard-facing economies *right from the beginning*.

Our pamphlet, S-101, goes into details. It is a valuable guide on how to make your mud gun screws, tap hole augers, pug mill paddles, gag press hammers, shear blades, guides, rolls, punches and other plant equipment do a better job at less cost. Write for your copy today.

COAST METALS, INC.

Plant and General Offices: 1232 Camden Ave., S.W. Canton 6, Ohio

Executive Offices: 2 West 45th Street, New York 19, N.Y.

COAST METALS
hard-facing
weld rods

MAKE YOUR EQUIPMENT LAST LONGER

Employment of Silver Brazing Is Permitted In Most Tool Repairs

Detroit

• • • Where loss in Rockwell hardness up to three points is permissible, silver brazing can be employed to repair broken tools of most types, the Detroit section of the American Welding Society was told at its November meeting by E. H. Smith, service engineer of Precision Spring Co.

Preliminary to brazing, Mr. Smith recommended the cleaning of the parts in carbon tetrachloride, then washing them with silver cleaning flux thinned to the consistency of water. Coating of flux to a distance of 2 in. or so from the broken edges on a broach will prevent oxidizing in the area of the weld, the speaker said.

In all cases of tool reclamation, the fixture must maintain the proper alignment. In the case of broaches, he recommended one fixed center and one adjustable center. For milling cutters, a fixture which completely circled the tool was said to be found the best.

In repairing a broken milling cutter, Mr. Smith advised the technique of cutting a groove, using a small grinding wheel or other means, on the surface of the broken edge, parallel with the exterior surface of the tool. Pilot holes should then be cut from the surface to these grooves, so that when the tool is assembled in the fixture a means exists of carrying the brazing metal down to the groove, at which point the broken pieces will be joined.

Steep Rock Board To Discuss Ore Output

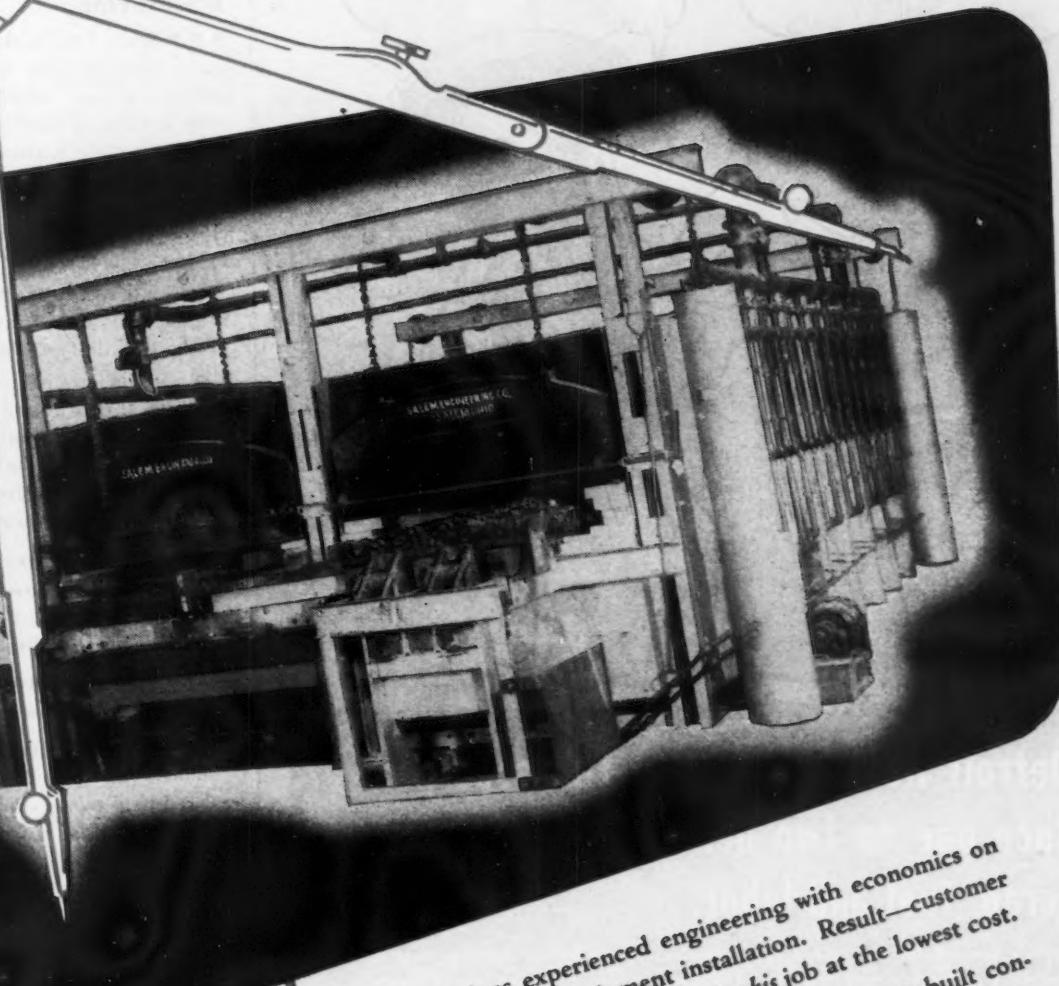
Pittsburgh

• • • A meeting of the board of directors of Steep Rock Iron Mines, Ltd., will be held in Toronto on Nov. 10. At this meeting the company's engineers, the company's consultants and various specialists will present to the board the details of the plan devised for 1945 activities which are designed to produce from 1,000,000 tons to 1,500,000 tons of ore.

Plans, contemplated to increase production in 1946 and 1947, will also be presented and discussed. Any production activities for the remainder of this season will be subservient and purely incidental to the broad program indicated above.

**the most efficient equipment
at the lowest cost**

ENGINEERED HEAT



A FEW PROFITABLE EXAMPLES OF SALEM'S ENGINEERED HEAT

Salem's Roller-O-Veyor Furnace
Tubular Furnace for Tubular
Products

Salem's Witter Mill
World's Largest Rotary Furnace

(Censored) Furnaces for War Pro-
duction

Salem's Circular Soaking Pit

Salem combines experienced engineering with economics on
every heat treating equipment installation. Result—customer
gets the best type of equipment for his job at the lowest cost.

In one instance, we may recommend a custom-built con-
tinuous furnace. In another case, Salem engineers will say—
“a small batch type furnace will fill the bill.”

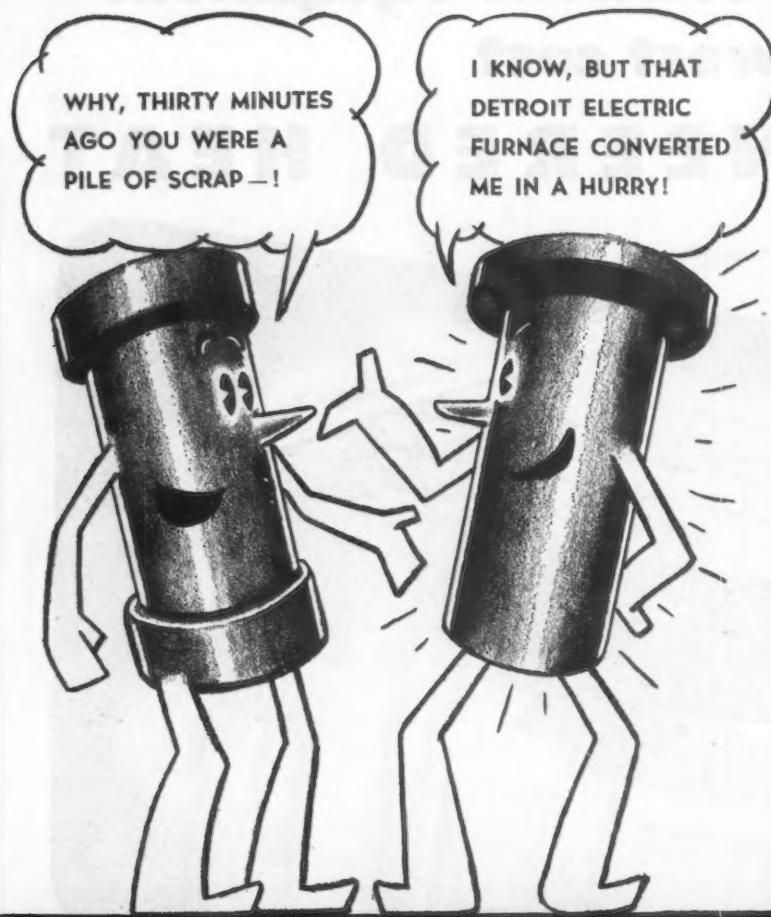
Whatever the requirements, Salem recommends the best
type of equipment for the specific production line. Salem
engineers have a name for the Salem service—“Engineered
Heat.” Others tab it—Salem Ingenuity.

In addition to unusual and revolutionary equipment,
Salem builds all types and sizes of batch and car
type, rotary, and other furnaces, for any fuel.

For your new production, have Salem put engineered heat to
work for you. *Prompt Attention to Your Heat Treating Inquiry.*

**SALEM ENGINEERING CO.
SALEM, OHIO**

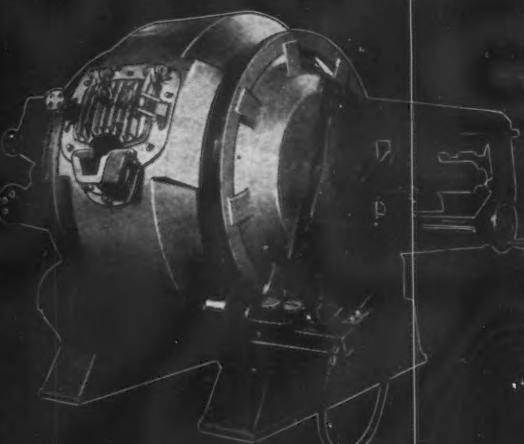




Detroit Rocking Electric Furnaces produce one to two heats per hour; save scrap, fuel and labor.

Today's demand for high speed production makes the Detroit Rocking Electric Furnace a natural in any foundry. You can run two brass or bronze heats an hour or you can take off a heat of Monel metal, nickel, stainless steel, alloy iron or other high temperature metal once an hour (oftener if you run smaller heats). And you can run a different mixture on each heat. Detroit Furnaces possess many other outstanding advantages. Close control over temperature and composition, together with the homogeneous melt which is assured by the automatic stirring action under non-oxidizing conditions, guarantees superior metallurgical results.

Detroit Furnaces save floor space, molding equipment, metal loss and labor. Built in sizes from 10 to 8000 lbs. molten metal capacity there is a size to fit every foundry need. Write today for facts and prices.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

NEWS OF INDUSTRY

Midwest Listing Of Spot Authorizations Totals 1,278 Items

Washington

• • • War Production Board "spot" authorizations for the production of civilian goods, which numbered 1278 with a total of \$202,428,000 as of Oct. 24, are widely scattered among manufacturers, many of them small organizations in small cities, it was disclosed recently in a tabulation issued by the agency.

Of the authorizations issued, only \$79,600,000 worth are scheduled for production before Jan. 1, WPB said.

A list of manufacturers in middle western states found by the WPB to have manpower, materials and plant capacity freed from war production and thus available for employment on civilian goods, follows:

ILLINOIS

Aurora

All-Steel Equipment Co.—metal cabinets.
Bentson Mfg. Co.—metal cabinets.

Bellville

Empire Stove Co.—gas floor furnaces.

Belvidere

Sanitary Scale Co.—computing scales.
Belvidere Vitreous Enameling Co.—shampoo lavatories.

Parsons Casket Hardware Co.—casket handles.

Bloomington

Dodge Dickinson Co.—box bed springs, inner spring mattresses.

Cairo

Sentinel Mfg. Co.—frozen food display case, food storage freezers.

Chicago

Maso Steel Products—typewriter & filing stands.

M & M Mfg. Co.—potato peelers.

Chgo. Art Novelty Co.—portable elec. lamp bases.

Kernes Mfg. Co.—portable elec. lamp bases.
All American Metal Spinning Co.—trumpet & trombone mutes.

Harry L. Jacobs—instrument mouth pieces.
The Englander Co.—bed springs, box springs, couches, sofa beds.

Nat'l Bedding Co.—box springs, inner spring mattresses.

Staffin Johns Co.—baby crib mattresses.

Expert Bedding Co.—inner spring mattresses.

Estee Bedding Co.—inner spring mattresses.
Inland Bed Co.—inner spring mattresses.

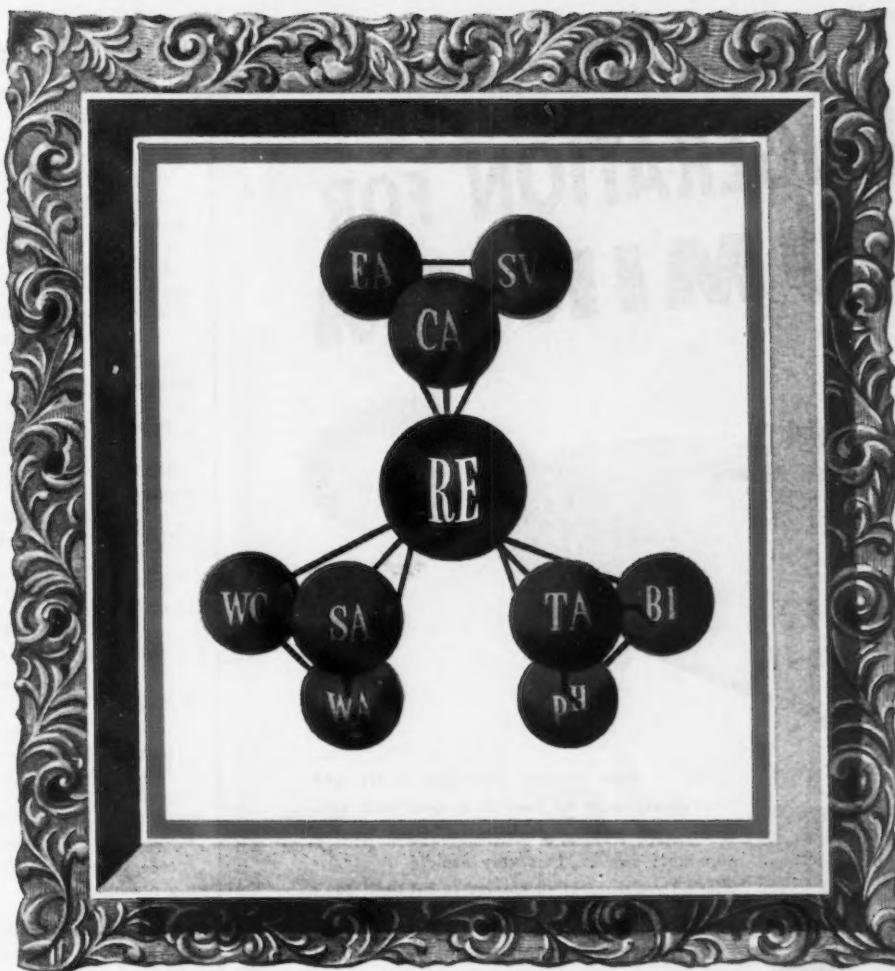
Liberty Bedding Co.—inner spring mattresses.

Illinois Bedding Co.—sofa beds, box springs.

Alvin Feinstein—electric hot plates.
Anthony Margotto—two burner electric hot plates.

Tuttle Septem—fruit & vegt. juice extractors.

Jagus Co.—expandible sign holders.



PORTRAIT OF STEEL BEING PICKLED

Whether you are cleaning steel for electroplating, protecting metals against rust and corrosion, or preparing aluminum for spot-welding, this is the picture of working factors in the scientifically balanced chemical compound. It is a cement floor being cleaned. It is a diesel engine or coils being descaled. *It is Turco in action.*

The relative value and balance of all the factors is determined by RE; for Research and Experience are the directing agents. They assign roles, give to each agent the correct emphasis, balance them all (one factor does not insure effectiveness in a compound any more than one drug in a prescription). RE symbolizes two decades Turco laboratories have devoted to solving industry's vital problems in the conditioning, maintaining and cleaning of surfaces. Take advantage of it on everything from washing a locomotive to preparing aluminum for anodizing. Call the Turco Field Service Man, or write to Turco.

**For a fuller explanation of these vital factors, write for Turco's "The Chemistry of Chemical Compounds," on your letterhead, please.*

- EA — Emulsifying Action disperses grease and oil as tiny globules, suspends them, and prevents redeposition.
- CA — Colloidal Activity disperses solids into minute particles easily removed.
- SV — Saponifying Value is the ability to convert organic fats and oils into soluble soaps.
- WC — Total Alkalinity (or acidity) is the total amount of either available for cleaning.
- TA — Buffer Index is the ability to absorb either alkaline or acid soil to prolong solution efficiency.
- BI — A yardstick for measuring the energy of alkalinity or acidity.
- PH — Solvent Action is the ability to put soil into solution.
- SA — Wetting Action lowers surface and interfacial tensions, causing solution penetration to base surface.
- WA — Water Conditioning removes or controls the elements which cause water hardness.
- RE — all the elements above are mobilized through Turco's Research and Experience.*

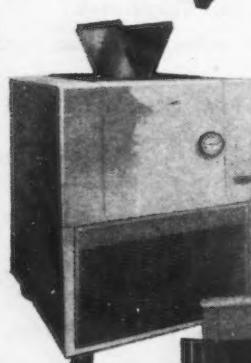
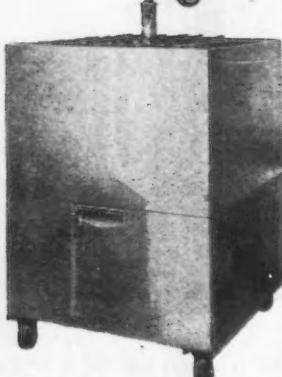


TURCO

INDUSTRIAL CHEMICAL COMPOUNDS

TURCO PRODUCTS, INC. Main Office and Factory: 6135 S. Central Avenue, Los Angeles 1 • Southern Factory: 1606 Henderson Street, Houston 10, Texas • Chicago Office and Factory: 125 West 46th Street, Chicago 9, Illinois • Offices and Warehouses in All Principal Cities

REFRIGERATION FOR ALUMINUM

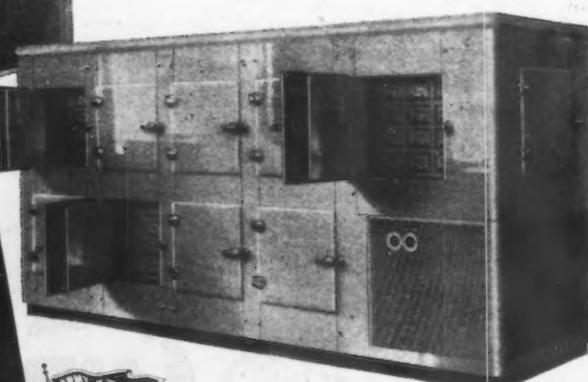


Heat treated aluminum rivets and sheets must be kept in a dead soft condition until used or fabricated. Heat treated aluminum ages very rapidly at atmospheric temperatures—becomes so brittle it can't be fabricated.

But if its temperature is promptly reduced to minus 40° F. and held at that temperature, the metal remains workable.

Kold-Hold has specialized in the engineering and manufacture of refrigeration equipment to keep heat treated aluminum dead soft. This includes the refrigerated quench, the refrigerated alcohol bath, the canisters for packaging rivets, storage cabinets and mobile cabinets to take rivets to the assembly line.

KOLD-HOLD MANUFACTURING CO.
438 NORTH GRAND AVENUE
LANSING 4, MICHIGAN



If you are working with aluminum,
Write
to KOLD-HOLD for
CATALOG
S-Z 431

KOLD-HOLD

NEWS OF INDUSTRY

Clark Production Machine Co.—floor sanding mach.

Decatur

U. S. Mfg. Corp.—fly swatters.

Crown Cork Specialty Corp.—wire bottle openers.

East St. Louis

Beagle Metal Products Co.—metal roll brackets.

G. A. Levy & Co.—metal signs.

Evanston

Cellini Craft—hollow ware bowls, platters, dishes.

Fulton

Patent Novelty Co.—fire shovels.

Granite City

Nat'l Enameling & Stamping Co.—tea kettles.

Harvey

Hi-Lor Mfg. Co.—electric humidifiers.

Mt. Vernon

Mt. Vernon Furnace & Mfg. Co.—floor furnaces.

Pekin

Murphy & Walsh, Inc.—steel septic tanks.

Quincy

Moorman Mfg. Co.—poultry feeders.

Springfield

Heineke & Co.—hand lawn mowers.

Atlas Mattress Co.—inner spring mattresses.

Springfield Mattress Co.—box springs.

Streator

Myers Sherman Co.—feed grinders, milking machines.

WISCONSIN

Ashland

Scott-Taylor Co.—infant cribs.

De Pere

C. A. Lawton Co.—stokers.

Eau Claire

National Pressure Cooker Co.—sauce pans.

Eau Claire Bedding Co.—inner spring mattresses, box springs.

Green Bay

Automatic File & Index Co.—metal visible reference panels.

Northwest Metal Products Co.—filing cabinets.

Janesville

Hough Shade Corp.—venetian blinds.

Kenosha

Moriarty Mfg. Co.—curtain rods.

Simmons Co.—box springs, coil springs, metal beds.

Kewaunee

Leyse Aluminum Co.—kitchenware, dinner pails.

La Crosse

Advance Bedding Co.—inner spring mattresses.

Madison

Capital Plating & Machine Co.—lead foil icicles.

Hanks Craft Co.—baby bottle warmers, sterilizers.

Milwaukee

Milwaukee Electric Tool—pneumatic hammers.

Phoenix Mfg. Co.—overhead doors.

Richard Buran—paper dispensers.

Adjustable Fixtures Co.—hospital bedside lamps.

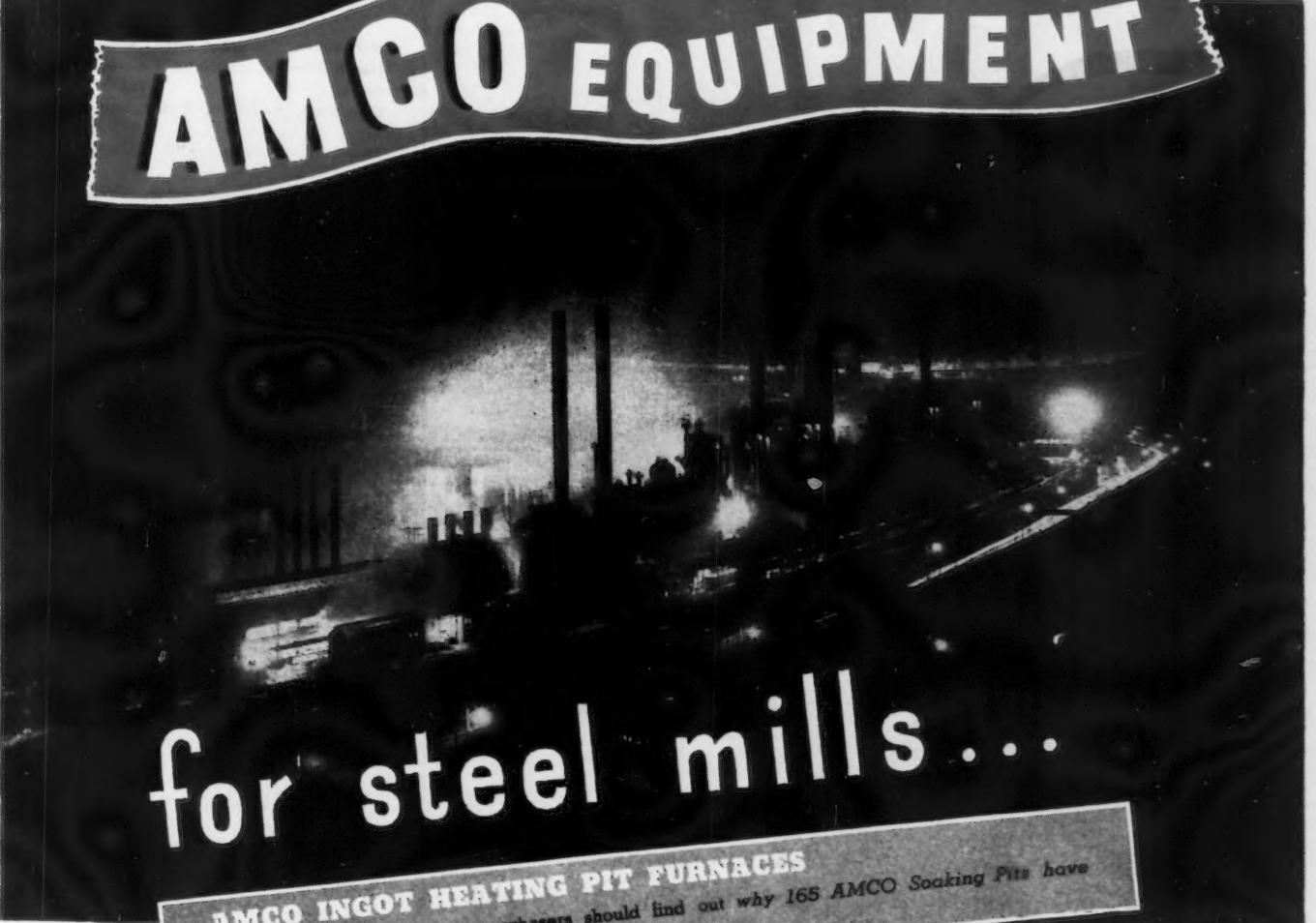
Midwest Lamp & Novelty Co.—table, floor lamps.

Wonder Rest Corp.—bed spring, inner spring mattresses.

Sealy Mattress Co.—inner spring mattresses.

Standard Bedding Co.—inner spring mattresses.

AMCO EQUIPMENT



for steel mills...

AMCO INGOT HEATING PIT FURNACES

Prospective purchasers should find out why 165 AMCO Soaking Pits have been purchased in recent years.

AMCO SIDE DOOR HEATING FURNACES

For reheating plate and forging ingots, slabs, and billets of all sizes—continuous doors where desirable.

AMCO CONTINUOUS PUSHER TYPE FURNACES

For reheating slabs and billets. Ingots up to 17" thickness successfully heated in charging-end-fired furnaces.

AMCO ALL REFRactory RECUPERATORS

More than 500 AMCO Recuperators installed in the steel industry during the past 8 years; preheated air temperatures up to within 700° F. of waste products temperatures.

AMCO OPEN HEARTH FURNACES

All sizes and types, complete with full automatic control and reversing.

AMCO PULVERIZED COAL SYSTEMS

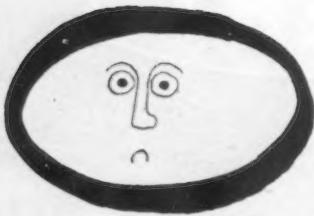
Including long distance transport—for all types of industrial reheating furnaces.

AMCO ENGINEERING AND CONSTRUCTION SERVICE

Inquiries solicited for redesigning, rebuilding, relocating furnaces; dismantling, moving, erecting other heavy equipment.

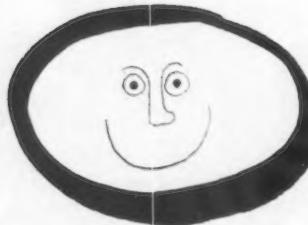


The **AMSLER-MORTON** Company
FULTON BUILDING • PITTSBURGH, PA.



Metal cleaning problems?

Call in WYANDOTTE!



BUSY as you are, you don't want to lose time and materials with metal cleaners that do less than an A-1 job.

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And if you spring a new process on him, he may be able to take care of that, too. He's backed by Wyandotte research and experience with all kinds of cleaning problems. He'll study your process and recommend the right cleaning materials.

Take advantage of the Wyandotte Representative's expert help. He's always available.



Wyandotte

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WYANDOTTE CHEMICALS CORPORATION
J. B. FORD DIVISION, WYANDOTTE, MICH.

*Service Representatives
in 88 Cities*

NEWS OF INDUSTRY

Milwaukee Venetian Blind—steel blinds.
Hersh Electric Specialty Co.—electric space heaters.

Sengbusch Self-Closing Inkstand—dip type pens.

Thos. H. Bentley—milk coolers, freezing cabinets.

W. E. Cheney Co.—electric elevators.
Heinn Co.—hospital chart holders.

Racine
Andis Clipper Co.—electric hair clippers.

Two Rivers
Metal Ware Corporation—electrical appliances.

Wausau
Northern Mattress Co.—inner spring mattresses.

West Allis
Griffith-Hope Co.—paper dispensers.

INDIANA

Anderson

Anderson Mattress Co.—box springs, divans and sofa beds.

Auburn

Auburn Burner Co.—class B oil burners.
Evansville

R & L Radio Mfg. Co.—hot plates, reflector type heaters.

Hoosier Cardinal Corp.—freezing trays, glide assemblies.

Fort Wayne

Bowser, Inc.—filters and stills for dry cleaning.

Griffith

Jas. H. Smith & Sons Corp.—photographic accessories.

Huntington

Majestic Co.—ash and garbage cans.

Indianapolis

Acme Mattress Co.—sofa beds, box springs.
Central Supply Co.—farm food freezer boxes.

Hirschman Co.—bed box springs.

Muncie

John Lee Div., Lerrick Corp.—safety and sanitary moldings.

Midwest Metal Products Co.—wire egg baskets.

Moore Co.—bed springs.

Ralph G. Taylor & Co.—golf clubs.

Richmond

Dille & McGuire Mfg. Co.—hand lawn mowers.

MICHIGAN

Detroit

Monarch Governor Co.—rear view driving mirrors.

Stainless Ware Co. of Amer.—domestic kitchen cooking utensils.

United States Bedding Co.—inner spring mattresses.

Hermansville

Furble Co.—ventilating system.

Ludington

Atkinson Mfg. Co.—closet accessories.
Handy Things Mfg. Co.—food mills, potato mashers.

Menominee

Heywood-Wakefield Co.—metal furniture.

TENNESSEE

Bemis

Sunset Mattress Mfg. Co.—inner spring mattresses, sofa beds, studio couches.

Chattanooga

Herron Stove & Furnace Co.—cast iron ware.

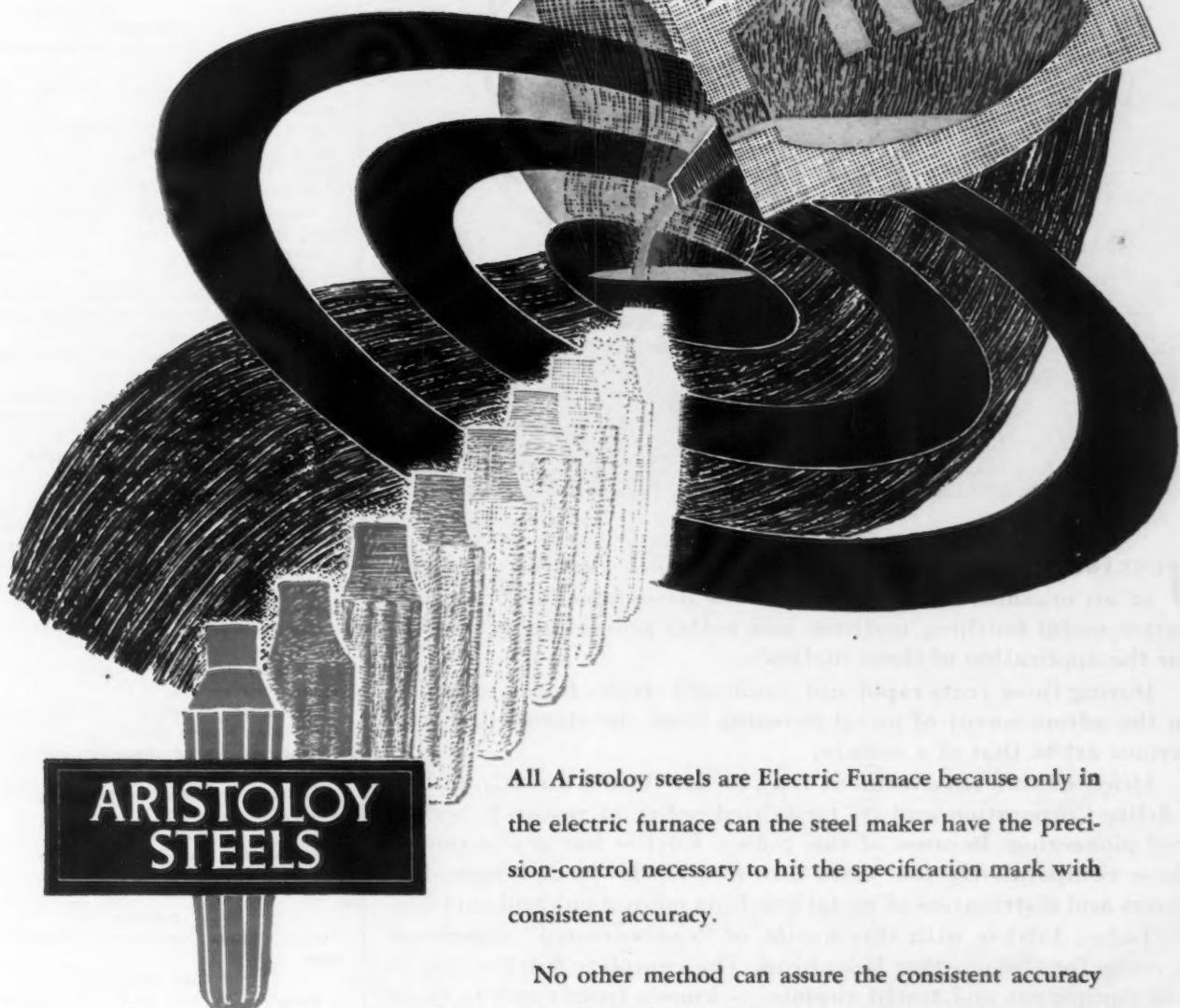
Hunt Spring Bed Co.—metal beds, inner spring mattresses, box springs.

Samuel Stamping & Engraving Co.—metal kitchen tables, gas hot plates.

Professional Golf Co.—golf clubs.

ARISTOLOY PRECISION CONTROLLED STEELS.

HIT THE MARK



All Aristoloy steels are Electric Furnace because only in the electric furnace can the steel maker have the precision-control necessary to hit the specification mark with consistent accuracy.

No other method can assure the consistent accuracy of predetermined physical properties or the close control of chemical analyses.

COPPERWELD STEEL COMPANY • WARREN, OHIO

CARBON TOOL STEELS • ALLOY TOOL STEELS

AIRCRAFT QUALITY STEELS • NITRALLOY STEELS

STAINLESS STEELS • BEARING QUALITY STEELS

NEWS OF INDUSTRY



JUST twenty-five years ago this month an idea was born—the idea of an organization dedicated to the development of new and better metal finishing methods and better processing equipment for the application of those methods.

During these years rapid and significant strides have been made in the advancement of metal finishing from the status of a mysterious art to that of a science.

Much of this advancement may be attributed directly to The Udylite Corporation and its farsighted policy of research, service and pioneering. Because of this policy, Udylite has grown during these comparatively few years into one of the largest manufacturers and distributors of metal finishing equipment and supplies.

Today, Udylite with this wealth of "concentrated" experience is ready for the job that lies ahead. The complete Udylite line of fine equipment and tested supplies is known from coast to coast as the best. The Udylite staff of experienced engineers and electro-chemists, combined with pilot plant, research and testing laboratory facilities, are a boon and a tradition to the industry.

The liberal Udylite Service Policy is unique, many times copied but never equalled.

Udylite is out ahead to stay, continuing to present improvements and new developments backed by twenty-five years of achievement.

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PRINCIPAL CITIES

Udylite

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1651 E. GRAND BLVD., DETROIT

Clarksville

Clarksville Foundry & Machine Co.—agricultural implements.

Covington

E. R. Daugherty & Son—farm trailers.

Jackson

Madison Mattress Mfg. Co.—inner spring mattresses, box springs.

Johnson City

Johnson City Spring and Bedding Co.—box springs.

Knoxville

Knoxville Bedding Co.—inner spring mattresses, box springs.

Cooper Bedding Co.—upholstered box springs.

W. J. Savage Co.—metal household furniture.

Memphis

Rotary Lifts Co.—lifts, automotive vehicle type.

Aircraft Electroplating Machine Works—metal furniture.

U. S. Bedding Co.—box springs, coil springs, inner spring mattresses, cots and rollaway beds.

Memphis Furniture Mfg. Co.—sofa beds.

National Rose Spring & Mattress Co.—sofa beds, box springs.

Slumber Products Corp.—box springs, inner spring mattresses.

Sanitary Bedding Co.—inner spring mattresses, dural sleeping equipment.

G. R. Hodges—electric irons.

Memphis War Industries—freezing and air conditioning equipment.

Vita Freeze, Inc.—freezing equipment.

W. E. Sanders Gas Heating Co.—gas floor furnaces.

W. J. Codley & Co.—metal signs.

Balton & Son—metal signs.

Nashville

Heater Battery Mfg. Co.—storage batteries.

American Battery Co.—storage batteries.

Rock City Construction Co.—ironing boards.

Marshall Spring & Mattress Co.—box springs, inner spring mattresses.

Capital City Mattress Co.—inner spring mattresses, box springs.

Jamison Bedding Inc.—inner spring mattresses, box springs.

Economaster Products Co.—radiant heaters, hot plates, heating stoves.

Tennessee Valley Associates—electric fans, water heaters.

Phillips & Buttorff Mfg. Co.—Class B stokers.

South Pittsburgh

Lodge Mfg. Co.—cornstick pans.

MISSOURI

Atherton

Clark Tractor Sweep Co.—tractor sweep rake.

Cape Girardeau

Superior Electric Prod. Co.—electric air heaters, auto. and non-auto. irons, iron oscillating fans, etc.

Carthage

Leggett & Platt, Inc.—inner spring mattresses, rollaway beds, bedsprings.

Kansas City

Berg-Gibson Mfg. Co.—battery charges.

Pugh-Enterprise Foundry Co.—manhole frames and covers.

Cramer Posture Chair Co.—swivel posture chairs.

Nevel Mfg. Co.—metal storage cabinets.

Maynel Mfg. Co.—safety deposit boxes.

National Steel Products Co.—file cases.

Wirecraft Products Co.—portable incinerators.

Rival Mfg. Co.—fruit juice extractors.

Newman Mfg. & Sales Co.—curtain stretchers.

SPOT YOUR BUYING POINT!

NEW ENGLAND

BOSTON, MASS.
H. Boker & Co., Inc.

MIDDLE ATLANTIC

BUFFALO, N. Y.
Root, Neal & Co.

ERIE, PA.
Boyd Welding Co.

NEW YORK CITY
H. Boker & Co., Inc.

PHILADELPHIA, PA.
Arcos Corporation

PITTSBURGH, PA.
Williams & Co., Inc.

ROCHESTER, N. Y.
Welding Supply Co.

SYRACUSE, N. Y.
Welding Supply Co.

SOUTH and SOUTHWEST

BATON ROUGE, LA.
Wm. D. Seymour Co.

BORGER, TEXAS
Hart Industrial Supply Co.

HOUSTON, TEXAS
Champion Rivet Co. of Texas

KINGSPORT, TENN.
Slip-Not Belting Corp.

PAMPA, TEXAS
Hart Industrial Supply Co.

OKLAHOMA CITY, OKLA.
Hart Industrial Supply Co.

TULSA, OKLA.
Hart Industrial Supply Co.

NEW ORLEANS, LA.
Wm. D. Seymour Co.

MIDDLE WEST

CHICAGO, ILL.
Machinery & Welder Corp.

CINCINNATI, OHIO
Williams & Co., Inc.

CLEVELAND, OHIO
Williams & Co., Inc.

COLUMBUS, OHIO
Williams & Co., Inc.

DETROIT, MICH.
C. E. Philips & Co., Inc.

FORT WAYNE, IND.
Wayne Welding Sup. Co., Inc.

KANSAS CITY, MO.
Welders Supply & Repair Co.

MOLINE, ILL.
Machinery & Welder Corp.

MILWAUKEE, WIS.
Machinery & Welder Corp.

ST. LOUIS, MO.
Machinery & Welder Corp.

WICHITA, KANSAS
Watkins, Inc.

WEST COAST

FRESNO, CALIF.
Victor Equipment Co.

LOS ANGELES, CALIF.
Victor Equipment Co.

PORTLAND, OREGON
J. E. Haseltine & Co.

SAN DIEGO, CALIF.
Victor Equipment Co.

SAN FRANCISCO, CALIF.
Victor Equipment Co.

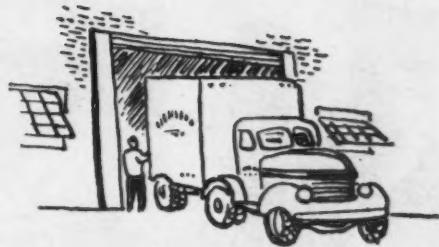
SEATTLE, WASH.
J. E. Haseltine & Co.

CANADA

MONTREAL, CANADA
G. D. Peters & Co. of Canada, Ltd.

HAWAII

HONOLULU, HAWAII
Hawaiian Gas Products, Ltd.



AN ARCOS WAREHOUSE STOCK IN YOUR CITY... or close at hand...

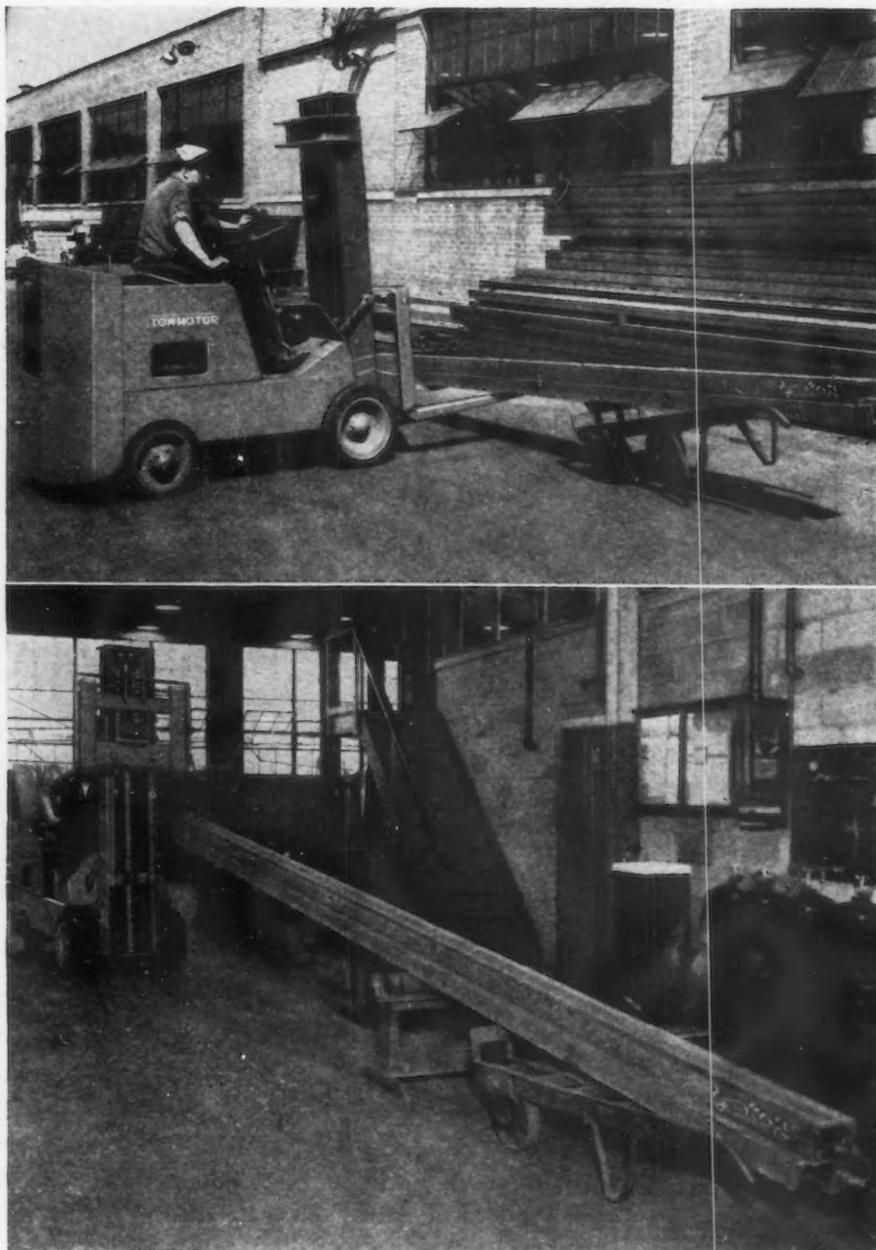
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Non-Ferrous (Bronze, Nickel, etc.) Electrodes

★Available for DC or AC Welding


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401 NORTH BROAD ST., PHILADELPHIA 2, PA.



"QUALITY WELD METAL
EASILY DEPOSITED"



NEWS OF INDUSTRY

Ruban Wood Finishing and Prod. Co.—scrub mop handles.

Vita Craft Corp.—cooking utensils, aluminum.

Confort Felt Co.—soft beds.

Sealy Mattress Co.—inner spring mattresses.

Jones Mattress Co.—box springs.

The Englander Co., Inc.—inner spring mattresses.

Ace and Ana Mattress Co.—sofa beds.

Northwest Tool & Die Works, Inc.—bicycle chain guards.

Colaire Produce Co.—utility cabinets.

William Voelker & Co.—Venetian blinds, metal.

Stone Mfg. & Supply Co.—branding irons.

Norvell Sieve Co.—sifters, bleaching entr. separators.

Harper Oven & Equip. Co.—reel ovens (bakers) proof rooms.

Locke Stove Co.—heating stoves.

Security Mfg. Co.—underfired water heaters.

Lamar

F. M. Thorpe Mfg. Co.—cone, twine holders, store display equipment, bicycle baskets, hand scoops, shovel type.

Nevada

W. F. Norman Sheet Metal Mfg. Co.—grave markers, shower stalls.

Springfield

O.K. Mattress Factory—inner spring mattresses.

St. Joseph

H. Ehrlich & Sons Mfg. Co.—display cases, reach-in refrigerators.

St. Louis

Otto-Items, Inc.—oil seals and grease retainers.

Benwood Linze Co.—chargers, battery, wall type.

Ever Ready Appliance Mfg. Co.—wash tubs.

Eberhardt Mfg. Co.—trouser creasers.

Fluorescent Fabricators—portable electric lamps.

Duplex Mfg. Co.—drum pedal, drum shares, cymbal holders.

Royal Bending Co.—studio couches, sofa beds, inner spring mattresses, box springs.

Smith & Davis Mfg. Co.—coil springs.

Foster Bros. Mfg. Co.—bed springs.

American Bed & Spring Co.—cots, bunks, berths and bed springs.

Artcraft Venetian Blind Mfg. Co.—venetian blinds, metal.

General Electric Supply Corp.—room space heaters.

Knapp-Monarch Co.—electric hair curlers.

Ritapoint Co.—mechanical pencils.

Metal Goods Corp.—lead, foil, tinsel.

Farmer Mfg. Co., Inc.—kerosene mantle lamps.

National Stoker Co., Inc.—class B stokers.

Atlas Mfg. Co.—cooking and food and plate warming equipment, electrical appliances.

Federal Brilliant Co.—metal signs.

Stout Sign Co.—metal advertising signs.

Missouri Jewelite Co.—electric signs.

IOWA

Oelwein

Midland Mfg. Co.—dust pans.

NEBRASKA

Beatrice

F. D. Kees Co.—ice tongs, calf weaners.

W. M. Haith Tank Works—stock-watering tanks.

Dempster Milk Mfg. Co.—farm machinery.

Lincoln

Capital Bedding Co.—bedsprings, dual sleeping equipment.

Omaha

Dependable Mfg. Co.—school furniture.

Orchard & Wilhelm Mattress Co.—sofa beds, inner spring mattresses.

Diversified handling operations can be quickly completed with savings in time, manpower and money only by use of versatile handling equipment having plenty of speed, power, and maneuverability,

such as

TOWMOTOR



THE 24 - HOUR ONE - MAN - GANG

TOWMOTOR CORPORATION • 1230 E. 152ND STREET, CLEVELAND 10, OHIO

Straight—gas powered industrial trucks exclusively—since 1919

CUT COST PER PIECE

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Looks like there'll be plenty of everything for most manufacturers before long. Plenty of labor. Plenty of materials. Plenty of COST. And that hurts!

The latter is probably more than just a slight headache for you right now. If that's the case, a good place to start doing something about it is to take a good look at what modern materials-handling methods can do to help.

Many a manufacturer (just as concerned about price as you are) has learned by experience that the right hoist in the right place cuts man-hours per part produced . . . aids production planning . . . utilizes more profitably every foot of floor space . . . reduces accident-frequency rates . . . and adds much to the well-ordered, production-boosting appearance of plant departments.

The right hoist for cutting your cost per piece, for production savings all along the line from raw material to finished product, is one of the many made by Robbins & Myers. The right place for it is something R & M Hoist experts can help you figure out. They are at your service, now.

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Jacksonville 305 Bisbee Bldg.
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Kansas City, Mo. 215 Pershing
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New York 200 Varick St.
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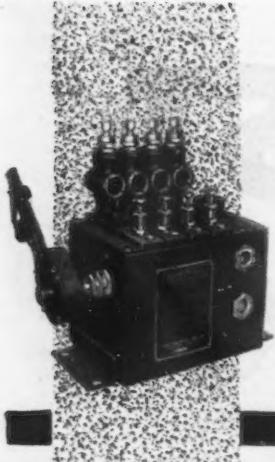
Two of the many R & M Hoists
that speed materials handling



The R & M Type F 1/2 Hoist has 1000 — 2000-pound capacity. It is provided with pendant, push-button control. A step forward in improved design, better materials, and manufacturing economies that provide a better hoist at lower cost in both purchase price and operation.



The R & M Type F Hoist has 1000 — 15,000 - pound capacity. Push-button control is standard. Operating with low headroom and handling loads from any angle with perfect balance, the Type F Hoist makes a one-man job of many otherwise cumbersome operations.



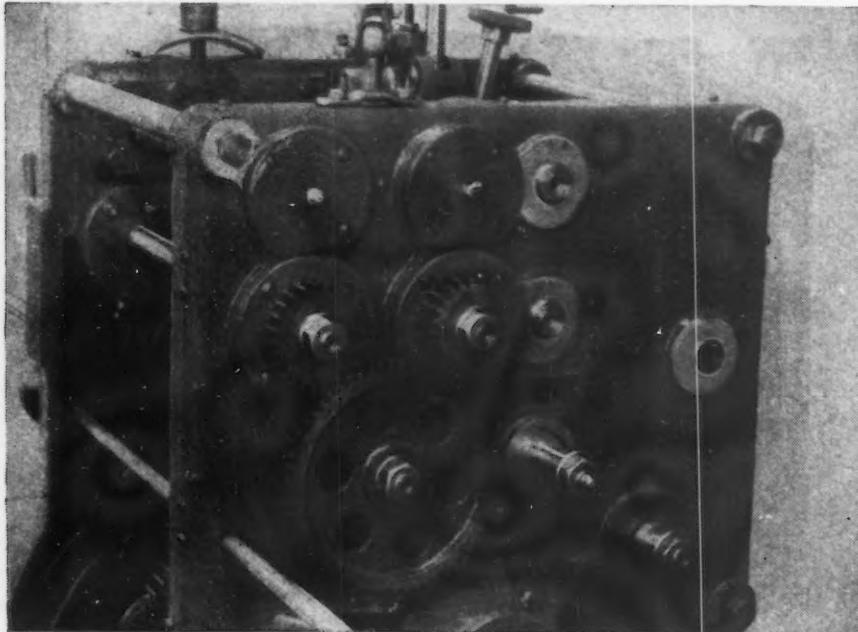
TORRINGTON

Force Feed Mechanical
LUBRICATOR

Positive, never-failing force-feed bearing lubrication. Design flexibility also enables power takeoff from machine to front, rear, side or bottom by ratchet or rotary means. For complete information write, stating number of feeds and drive desired.

THE TORRINGTON

MANUFACTURING CO., TORRINGTON, CONN.



HELPS TO GREATER ACCURACY in Spring Coiling

No. 9 Auxiliary Wire Feed Gears

Arranged on the exterior of all Torrington Segment Type Spring Coilers, accessible for quick changing, there is a set of change gears whose importance is often not fully realized.

Increased accuracy and reduced wear of the segment gear are possible when coiling short springs, by using the proper set of change gears. Accuracy of wire feed minimizes stock removal in grinding. Gears doubling the stroke of the segment will cut the inaccuracy in half.

To coil a spring of .172" wire, .6" i.d., 5 turns, open pitch, squared ends, requires about 12 $\frac{1}{2}$ " of wire. On a W-125, using standard feed gears, the segment would operate on three or four teeth, causing excessive wear on these teeth and undue strain on the machine, because of the heavy wire and small spring diameter. Applying a set of shorter feed gears, the segment will operate on 10 or more teeth, with a minimum load, due to the lesser overdrive.

Still maintaining reasonable accuracy, the usual wire feed for a given segment throw may be approximately doubled. Charts supplied with all coilers show gearing for extra feeds and proper wire diameters.

December 21st—Continuous and "Popcorn" Coiling



THE TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

NEWS OF INDUSTRY

Central Mattress Co. — upholstered box springs, sofa beds.

L. G. Doup Co.—box springs, innerspring mattresses, sofa beds.

M. C. Grath Welding & Machine Works—tractor, loader.

Omaha Neon Sign Co.—metal signs.

Ralston

Sensation Mower Co.—power lawn mowers.

MINNESOTA

Albert Lea

Queen Stove Works, Inc.—broader stoves. American Gas Machine Co.—water heaters.

Farmington

Bleeker-Foster, Inc.—Kitchen utensils.

Haastings

C. A. Lund Co.—steel edges for skis.

Isle

Mille Lacs Lake Spinner—fishing tackle.

Minneapolis

D. R. Rogers Co.—auto jacks.

Tobin Arp Mfg. Co.—main bearing boring machines.

Armeo Drainage & Metal Products, Inc.—corrugated metal curverts.

Reese Metal Weather Strip Co.—weather strips and automatic door bottoms.

Car-Max Mfg. Co.—dust pans, juice extractors.

The Gunnard Co.—jar wrenches.

Salisbury Satterlee Way Co.—baby crib springs, box springs.

Land-O-Nod Co.—dual sleeping equipment, box springs.

The Federal Engineering Co.—steak and meat tenderizing equipment.

C. H. Berglund Co.—milk bottle carriers.

Stockland Road Machinery Co.—scrapers.

Jackson Machine Works—hammermills.

Branham, Moreck & Driepner—floor drain floats.

L. Ewald Co.—plunger cleaning machines.

General Outdoor Advertising Co.—painted display structures.

St. Paul

Farwell Ozmun Kirk Co.—metal nail bins. Sanitary Bedding Co.—box springs, inner spring.

Brown & Bigelow—pocket knives.

L. & K. Laboratories—monograms for cosmetics.

Louis F. Dow Co.—calendars.

Lactona, Inc.—tooth brushes, surgeon hand brushes.

Winona

Vulcan Mfg. Co.—portable upright jacks.

OHIO

Ashtabula

Hulbert Creeper Co.—kitchen creepers.

Bedford

Taylor Chair Co.—wood swivel chairs.

Cincinnati

Heekin Can Co.—kitchen garbage and refuse receptacles.

Lockwood Mfg. Co.—cooking utensils.

Charles A. Maish Co.—inner spring mattresses, box springs, sofa beds.

Gruen National Watch Case Co.—filled gold watch cases.

Cleveland

Cuyahoga Spring Co.—running board side, molding clips.

U. S. Air Compressor Co.—hydraulic auto lifts.

Interior Steel Equipment Co.—metal shelving.

United Vac. Cleaner Stores, Inc.—domestic vacuum cleaners.

Ballanaff Metal Prod. Co.—heat resisting pad for kitchen use.

Joseph Zahari—garment hangers.

Kromex Corp.—household cooking utensils.

Burgess Fastening Equip. Div.—kitchen memorandum reminders.

PHILCO IS READY TO REDUCE YOUR POST-WAR BATTERY COSTS



THE NEW "PHILCO THIRTY" *Gives 30% Longer Life*

Storage battery purchases made from now on, are essentially a post-war investment. So be sure to keep posted on this sensational post-war Philco Battery development—the new Philco Thirty that gives 30% longer life! Here, at last, is a really revolutionary new long-life construction—employing a brand new principle of FABRICATED INSULATION!* It's available now in certain types and limited quantities. And as rapidly as war time restrictions are eased, Philco will make it possible for every user of electric industrial trucks to share in the new economy and more efficient operation of this great new battery. Write today for information. *Patent Applied for

PHILCO CORPORATION, STORAGE BATTERY DIVISION
TRENTON 7, NEW JERSEY

Specify
PHILCO
INDUSTRIAL TRUCK
BATTERIES

FOR 50 YEARS A LEADER IN INDUSTRIAL
STORAGE BATTERY DEVELOPMENT

THOMAS

Flexible COUPLINGS

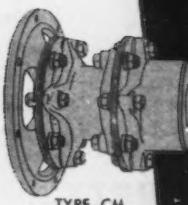
FOR any SPEED OR SERVICE



TYPE DBZ



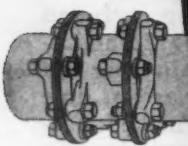
TYPE DSM



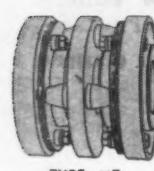
TYPE CM



TYPE ST



TYPE AM



TYPE MT

Eliminate
**BACKLASH, FRICTION,
 WEAR AND CROSS-PULL**
the 4 destructive evils found in
 all other types and makes of couplings.

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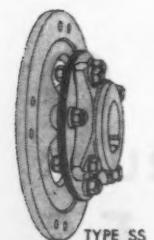
**NO BACKLASH
 NO WEAR
 NO LUBRICATION
 NO THRUST
 FREE END FLOAT**

These are the five essential features of
 Thomas Flexible Couplings that insure
 a permanent care-free installation.

WRITE FOR COMPLETE
 ENGINEERING CATALOG

HIGH SPEED HEAVY DUTY FLOATING SHAFT TYPE FLEXIBLE COUPLING

TYPE DBZ-D



TYPE SS

**THE THOMAS PRINCIPLE ELIMINATES CHAINS,
 SPUR GEARS and other VIBRATING MAKESHIFTS**

THOMAS FLEXIBLE COUPLING CO.
 WARREN, PENNSYLVANIA

NEWS OF INDUSTRY

Monarch Aluminum Mfg. Co.—household aluminum ware.

H. Goodman, Inc.—box springs and sofa beds, inner spring mattresses.

Ohio Mattress Co.—inner spring mattresses.

Abar Mfg. Co.—electrical mfg. machy.

Cleveland Range Co.—electric operated steam cooker.

White Sewing Machine Corp.—domestic sewing machines.

Fred Zimbalist & Co.—musical powder boxes.

Thomas McDougall Lighting Co.—exterior lighting fixtures.

May-Zee Mfg. Co.—non-mechanical water coolers.

Robinson Mfg. Co.—laundry tray stands.

Columbus

Ohio Dept. of Highways—destination arrow signs.

Dayton

Nagel Metal Spinning & Mfg. Co.—aluminum cooking utensils.

Defiance

D & C Mfg. Co.—hand tire pump assemblies.

Fostoria

Electric Auto-Lite Co.—automotive heaters, hot air.

Fredericktown

Gregg Mfg. Co.—metal dust pana.

Galion

Perfection Steel Body Co.—combination trailer and farm wagons.

North Electric Mfg. Co.—telephone gongs.

Garfield Heights

Meters & Pumps, Inc.—rotary barrel type pump.

Hillsboro

Gross Ferbel Co.—safety deposit boxes.

C. S. Bell Co.—hand burr mills, power burr mills, hammer mills.

Mansfield

Perfection Bed Spring Co.—bed springs.

Humphries Mfg. Co.—enameled iron bath tubs, sinks, etc.

Miamisburg

B & P Motor Sales Co.—electric irons.

Painesville

Alden Mfg. Co.—bronze weather strips and brass and felt door bottoms, edging, furniture and linoleum trims.

Piqua

Piqua Mattress Co.—inner spring mattresses.

Springfield

Robbins & Meyers, Inc.—10-inch electric fans.

Steel Products Engr. Co.—coal stokers.

Long, Eakens Co.—fryers.

Toledo

Air-Way Elec. Appliance Corp.—domestic vacuum cleaners.

Urbana

W. B. Marvin Mfg. Co.—utility filing cabinets.

Donald C. Jones—farm wagons.

KENTUCKY

Buffalo

E. S. Ferrill & Son—galv. wash boilers and canners, coal buckets.

Glasgow

Glasgow Mattress Co.—inner spring mattresses.

Louisville

Kentucky Sanitary Bedding Co.—inner spring mattresses.

Louisville Bedding Co.—inner spring mattresses.

Newport

B & L Mfg. Co.—aluminum cookie sheets.

Owensboro

Murphy Chair Co., Inc.—steel swivel office chairs.



THE LIMITROL

THE new Limitrol Comparator Gage by Woodworth will reduce your production costs, speed up inspection operations and reduce scrap.

The Limitrol checks errors involving pitch diameter, lead, taper, angle, out-of-roundness and straightness. Two or more errors might compensate for each other . . . enabling satisfactory assembly of the part . . . if a part passes the Limitrol . . . it will assemble.

Cut your inspection costs with Limitrol by combining greater speed with greater accuracy. Write for your copy of Limitrol Catalog No. 44-L.

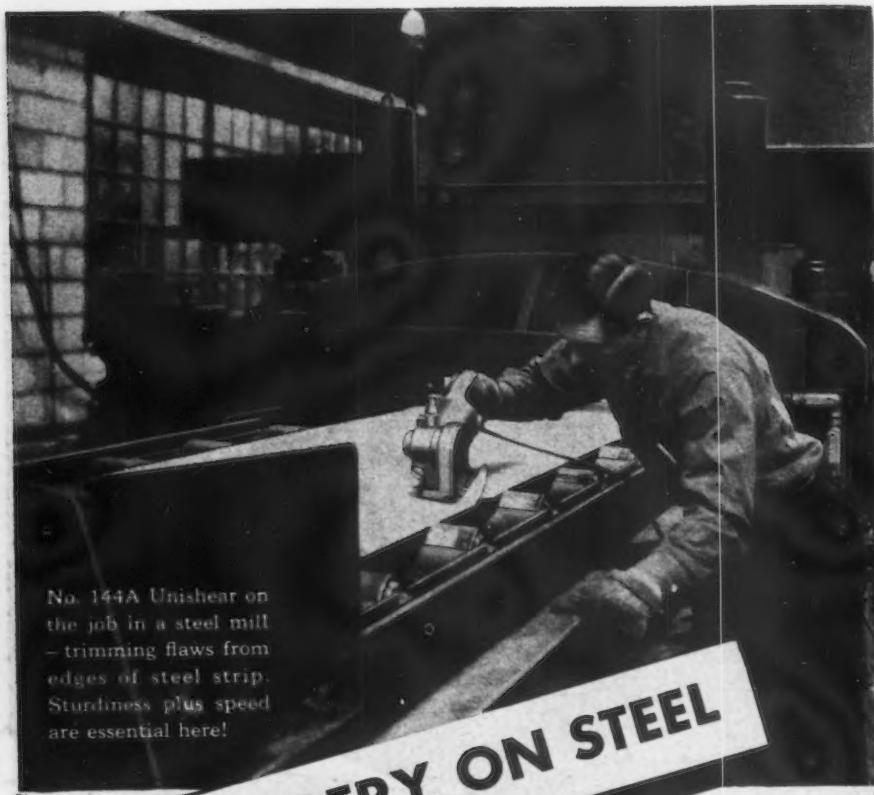
ACCURACY YOU  CAN TRUST

Graduated Dial

Graduated Dials are furnished as standard equipment at no extra price. The dials are graduated in increments which approximate .0005 inch when the magnification is 250 to 1 and serve as a guide in determining just how far over or under the limits the part might be.

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD • DETROIT 20, MICHIGAN
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SURGERY ON STEEL



No spreading cracks or weakening flaws get by this Unishear operator on a steel rolling mill. Defects in the sheet steel are snipped out as they roll by — a product protection afforded by Stanley Unishear's powerful, fast-cutting action. Unishear cuts up to 15 feet per minute as fast as you feed.

Stanley Portable Unishears are made in four models — for 18, 16, 14 and 12 gauge hot rolled steel or galvanized iron. Stationary Unishears — for 14 gauge and 10 gauge sheets. Write for literature. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.

STANLEY

ELECTRIC TOOLS FOR INDUSTRY

NEWS OF INDUSTRY

Pittsburgh Coal Co.'s John Morrow Honored For Industrial Work

Pittsburgh

• • • Belated recognition came Oct. 31, in Charleston, W. Va., to one of the most shy and modest, yet hardest

working executives of the coal industry, John Bain Morrow, president of the Pittsburgh Coal Co.

The American Institute of Mining and Metallurgical Engineers, in the Daniel Boone Hotel, bestowed upon the 58-year-old man, the Percy Nichols

Award, which is given for "notable scientific or industrial achievements in the field of solid fuels."

Although the award is given annually, this will be the first time that an outstanding contribution in the field of production and preparation of coal for the market has been recognized.

Morrow is better known to associates as "J.B." He represents the seventh generation of his family to be actively engaged in the coal industry. He hails from Nova Scotia, but for almost 40 years has worked in the United States.

Friends of Mr. Morrow feel that he has a right to be as proud of the financial record of his administration as he has of his achievements as a leader.

Admiral Corp. Places Order for Refrigerators

Chicago

• • • Admiral Corp., Chicago, which has acquired the major household appliance business of Stewart Warner, has contracted with American Central Mfg. Co., Connersville, Ind., to provide an initial order of 125,000 postwar refrigerators. American Central, which operates the former Auburn Plant, several weeks ago won the nod from Willys-Overland to build 25,000 civilian jeep bodies as a starter of a drive to invade the postwar market.



J. B. Morrow

"Put it on the Blanchard"

...GET THESE
ADVANTAGES

Production ✓

Adaptability

Fixture Saving

Operation Saving

Material Saving

Fine Finish

Flatness ✓

Close Limits



W-838

Grinding **Cast Iron Rings**

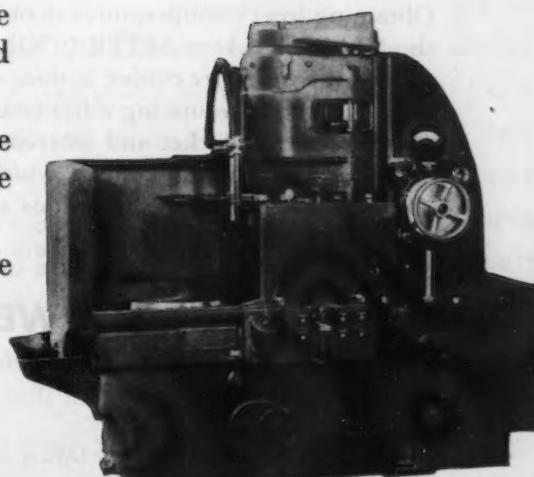
Five of these 12" x 1 1/2" cast iron rings are securely held on the 36" magnetic chuck of a No. 18 Blanchard Surface Grinder. Twenty pieces (40 surfaces) per hour are ground flat and parallel, removing $1/64$ " from each surface.

The illustration shows the narrow surface being ground, the opposite side is a ring of 8" inside diameter and 12" outside diameter and is ground flat within .0005".

For the multiple grinding of parallel surfaces such as these "put it on the Blanchard".



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



No. 18 BLANCHARD SURFACE GRINDER



The **BLANCHARD** MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

Improved AFTER COOLING METHOD

DRIES COMPRESSED AIR MORE THOROUGHLY

and Saves Cooling Water Costs



U. S. Patent
Re-issue No. 22,533



EXTRA DRYNESS is vital to industrial users of compressed air, as in spraying protective coatings or in using air to clean fine instrument parts. And you protect all air tools, grinders, hammers, riveters—from water damage, from freezing and from loss of lubrication when the air is thoroughly dried in the NIAGARA Aero AFTER-COOLER.

Obtaining lower temperatures than with ordinary after-cooling, the NIAGARA Aero AFTER-COOLER produces air that is far drier. An evaporative cooler, it does not consume water, but repays its cost by eliminating water bills. It also provides controlled temperature for jacket and intercooler water with the Niagara "Balanced Wet Bulb" control which automatically assures the correct admixture of fresh outdoor air with recirculated air.

Write for Bulletin 96 and 98

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

DEPT. LA-114, 6 E. 45th St.

NEW YORK 17, N. Y.

Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING • HEATING • DRYING
NIAGARA
 HUMIDIFYING • AIR ENGINEERING EQUIPMENT

NEWS OF INDUSTRY

Surpluses to Threaten Screw Machine Industry

... by T. E. LLOYD ...

Pittsburgh

• • • The disposal of 20,000 government owned screw machines, which are surplus, presents the screw machine products industry with the greatest problem in its history, since this vast number is better than double the normal capacity of the industry.

Growing from about 300 companies in 1934 and 400 companies in 1940 to about 800 companies presently in business, with an expansion of four to one in capacity since 1940, this industry is faced with a heavy overload of capacity after the war without the addition of new capacity from government-owned surplus machines. It is presently estimated that there are between 20,000 and 25,000 screw machines that are government owned or controlled in the United States, not counting those that were turned back to the government from Allied foreign countries as return lend-lease as contracts from these countries were terminated in American plants.

A survey recently made showed that in 1934 there were some 6700 screw machines in the plants of 300 screw machine products manufacturers in the jobbing industry. From 1934 to 1939, 5000 multiple and single spindle machines were added to the industry, but from 1940 to 1942 there were 8500 multiple and 9000 single spindle machines added. Currently, there are an estimated 42,000 total active machines in the United States in both captive and jobbing shops, of which a bit over 40 per cent are in job shops.

Thus, the disposal of more than 20,000 surplus screw machines through government channels would just about double the capacity of the industry. Since the screw machine products industry is, in itself, a small jobber industry, such "dumping" would wreak havoc upon the industry. Being a "small business" industry, of an owner-managed type, it nevertheless has manufacturing industries of all types dependent upon it for components used in the production of all types of mechanical products. The average company in the industry in 1942 had in production about 43 primary operation machines, with plant and equipment valued at about \$200,000 and inventories worth about \$75,000.

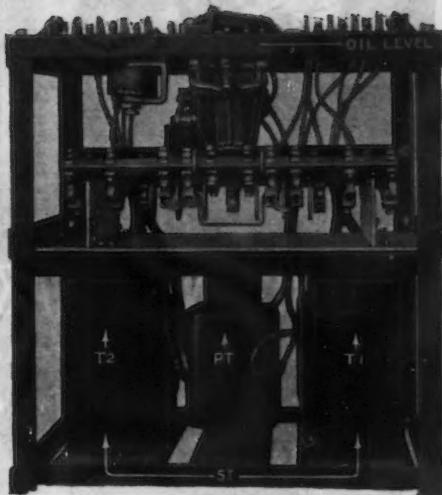
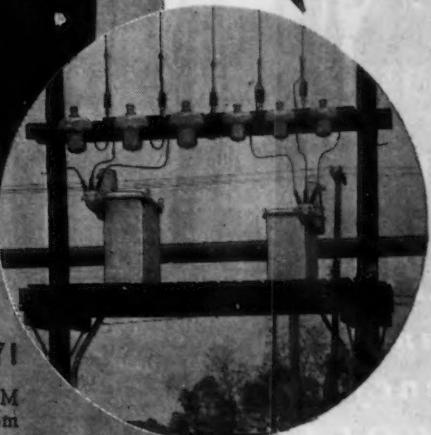
Consequently, it is with considerable reason that this industry is ap-

EC&M Builds 2300 Volt Motor Starters



THEY COULDN'T RISK A DELAY!

Prominent oil refinery selected EC&M 2300 volt Starters and mounted them out-of-doors on platform between power poles.



CLEAN-CUT DESIGN

1. Single, quick-break, double-throw contactor operated by a single magnet.
2. Two liberally-rated auto-transformers marked T₁ and T₂.
3. Potential transformer (marked PT) for .220 volt push button circuit.
4. Current limit relay trips mechanical latch to transfer from reduced to full voltage.
5. Variable reactor on top of mechanism permits quick change of transition-setting, when desired.
6. Continuous torque acceleration.
7. High torque efficiency in starting.
8. Adjustable, magnetic type overload relays, arranged for magnetic reset from push button.



● In many plants, managements have come to know that EC&M Unit Starters are a valuable ally for their 2300 volt motor starting requirements. Complete enclosure of all high voltage parts not only provides a *shock-proof* installation but reduces time and material in installation. With the mechanism totally oil-immersed, operating parts are always lubricated and also protected from corrosion. Push button operation brings the motor up to speed with greater skill than human hands could do it. What could be safer—more reliable!

Ask for Bulletin 1047-C

THE ELECTRIC CONTROLLER & MFG. CO.
2698 E. 79th ST. ★ CLEVELAND 4, OHIO

EFFICIENT SHAKEOUT
*reduces maintenance
 increases efficiency*
 of DUSTUBE COLLECTORS

Equally as important as the initial investment required for dust collecting equipment is its efficiency and cost of operation. One criterion here is the method of shakeout employed in periodically freeing the filter tubes of the dust they have collected. Improper shakeout is one of the prime causes of wasted horsepower, excessive tube replacement, and excessive back pressure which allows the dust to settle back in the pipes of the entire system.

In Dustube collectors the filter is limp and deflated and completely subject to the shaking action. Any dust cake is effectively broken up and deposited directly into the hopper below. The Dustube filter is never shaken under tension which might enlarge the pores of the cloth. It is not stretched over a wire cage or form which might tear it or cause increased wear. With a Dustube shakeout periods are shorter and less frequent . . . horsepower is saved . . . filter tube wear decreased. Because the filter is thoroughly cleaned the danger of back pressure is eliminated. Dustube will efficiently handle your dust problem. Write for more information today!

**American Foundry Equipment Co., 510 S. Byrkit Street
 Mishawaka, Indiana**

AMERICAN *dustube*
 dust collectors



NEWS OF INDUSTRY

prehensive of the disposition of government owned or controlled screw machines to the extent of 100 per cent of its present capacity.

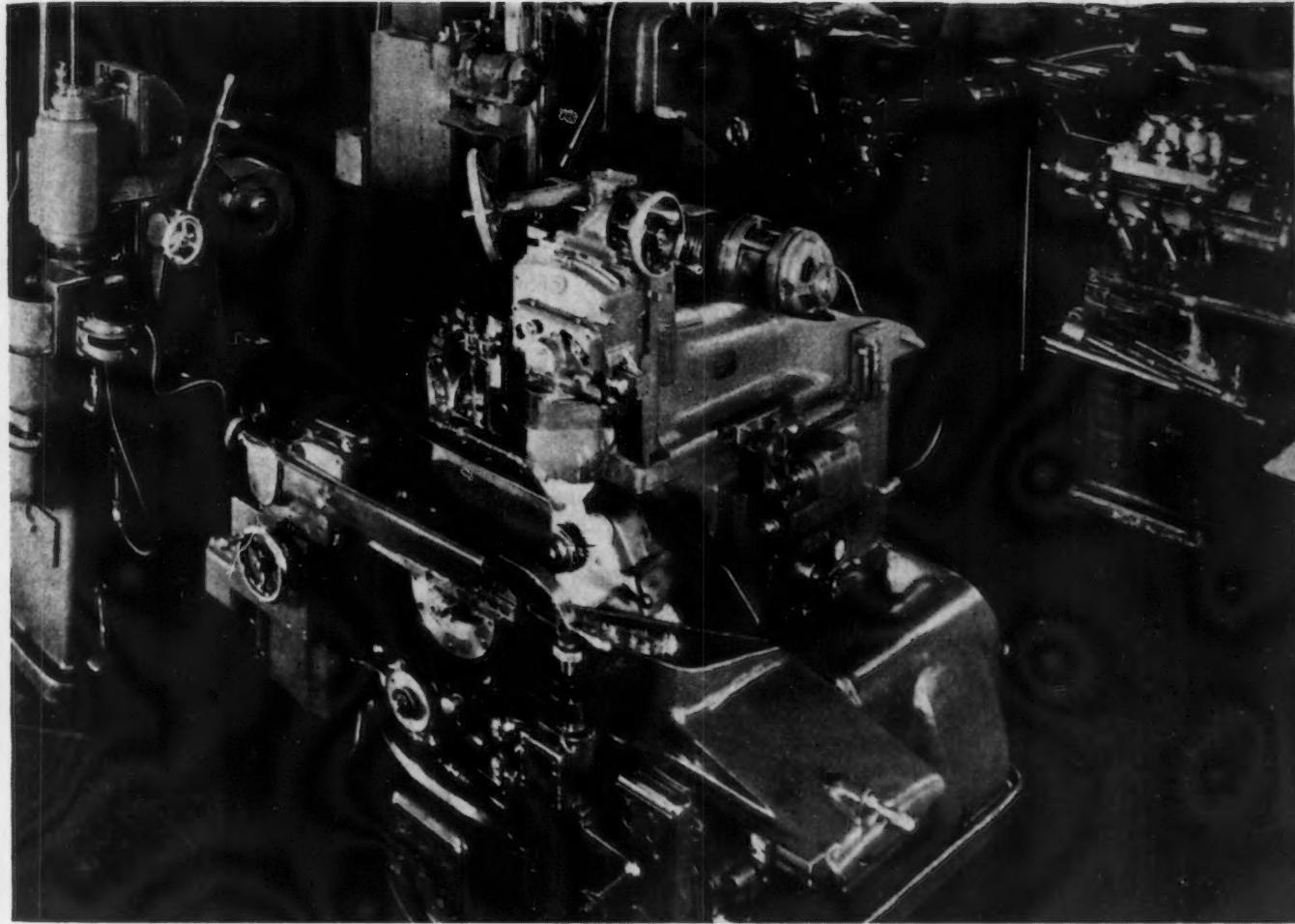
The National Screw Machine Products Association, representing a large segment of the screw machine products companies in the country, is now determining just what is available in the way of surplus screw machines, how many, the types, the makes, the sizes, and other such data. This information is being compiled both for privately owned and government controlled machines throughout the country. However, the difficulty concerning government owned or controlled equipment is that no one appears to have complete records.

Consequently, working through the Senate Sub-committee on Surplus War Properties, a resolution was offered for presentation before the Senate Subcommittee, asking that all government agencies furnish complete statistical information as to the total number of single and multiple spindle machines and the sizes thereof that have been put into domestic use during the period from Jan. 1, 1942 to Sept. 30, 1944. Also, the resolution asks for the number now owned by the various government agencies. In conjunction with this, the Association proposes to make available all similar data on private equipment to the government.

Through these compilations, it is hoped that a sane and orderly solution to the surplus problem in screw machines can be worked out. It is felt by the industry members that it is not economically sound nor in the interest of the promotion of free enterprise for the government to financially assist any individual firm, corporation or enterprise in the purchase of surplus machine tools when such financial assistance is solely for the purpose of aiding in the disposal of the government's surplus equipment, since the economies of the industry are more for reaching than just the disposition of a lot of machines.

During the two year period from 1940 to 1942, the number of screw machines built in this country totaled between 80 and 90 per cent of the number in use prior to that time. However, in that same period, the Association Business Index showed that screw machines going into the plants of prewar screw machine products manufacturers totalled only 14 to 18 per cent of the prewar number. From these figures, it can easily be deduced that there were many new-

BETTER *Lubrication* Means Better Maintenance



Is difficult maintenance a problem? Maybe excessive wear due to inefficient lubrication is the cause. That's where Sinclair specialized lubricants can help.

SINCLAIR GENERAL PURPOSE OILS and GREASES offer a compact group for safe lubrication of equipment on 3-shift operation.

Sinclair also offers a diversified line of cutting oils designed for greater precision and finer finish in all types of machining.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

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NEWS OF INDUSTRY

PORTRAIT OF AN



who says that even
the newcomers can
mate units more quickly
when they assemble

SCREW
MACHINE
PRODUCTS
made
FASTER
and
BETTER
for
LESS
by

U.S. AUTOMATIC
CORPORATION
Screw Machine Products
AMHERST • OHIO



Chicago Detroit New York

comers, both privately and government financed, in the field.

An examination of statistics compiled by the NSMPA indicates that the break-even point of the industry is about 2000 hr. operation per machine per year, or about 40 hr. per week. With some 17,000 to 18,000 machines owned outright by the jobbers of screw machine products, the addition of another 20,000 in the field might well pull the entire industry down into the red side of the ledger in a peace time economy. This is based on the fact that these 17,000 or 18,000 machines in operation could have supplied more than enough products for all uses in 1940.

Another factor emphasized by the screw machine industry pertains to the sizes of machines in operation. Screw machines over 2 in. in diameter are not an economic factor in peace time production, and are therefore surplus because of size rather than quantities. To sell them to newcomers into the field, which will include many returning servicemen, would work a hardship on these prospective manufacturers. This would result in private capital being invested in bad competition with the government taking money from small businesses that can ill afford any such losses. This money could be better utilized in more profitable enterprises. Currently, 92 per cent of the multiple spindle machines now in use in jobbing shops are under the 2 in. size. While 28 per cent of the single spindles are over 2 in., they represent only 2 per cent of the total machine production.

To assist in the orderly disposal of screw machines that will take into account actual usage of these machines and underlying economic factors, the screw machine products industry is preparing a program for discussion and presentation to Senate Sub-committee hearings to be held late this year.

This program includes a number of interesting points generally not previously considered in the disposal of surplus screw machines. As, for example, the industry will, through its trade association, submit data to the government to prove what percentage of screw machines over 2 in. in diameter capacity are not an economic factor in civilian production and for that reason are surplus because of size rather than quantity. Recommendation will be made that the government should not offer these machines for general sale since to



GOLD DREDGE- -1945 MODEL

Progressive firms today recognize employee-produced ideas as golden assets. Getting that gold out where it can benefit your business is the specialty of the Morton Suggestion System. Modern as a gold dredge, this equipment far outstrips prospector pan methods of reaching employee ideas.

The Morton Suggestion System produces a steady flow of high quality precious material. Organizations of every size and type respond to the professional way the Morton System does its job.

In more than 10,000 installations to date, this modern idea-producer has earned literally millions of dollars for its users. In the times just ahead, ways of lowering operating costs, reducing waste and increasing efficiency will be worth important money to your business. You can get them with the Morton Suggestion System—and at surprisingly low cost.

Get the complete facts about the Morton System *immediately*. Drop us a line today for the cost-free details—there's no obligation.

**MORTON MANUFACTURING CO.
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POLLAK *Pioneers a New Version* *of Re-conversion*

Production for war has created new methods of co-ordinating the planning and development of products to supply future consumer demands.

To save valuable time for business leaders and their engineers in product design and manufacture, Pollak has developed a new version of reconversion.

Briefly, it is a pooling of the Pollak experience in modern design, new techniques in metals, and production short cuts, with the brains of the planning staffs of American industry.

This should result in increased economy and efficiency in production.

There is no obligation involved in this mutual planning. And it is successful. A number of mechanical parts and assemblies are already awaiting material and manpower releases to go into production at Pollak.

It is likely that Pollak facilities and capacity are large enough to absorb the manufacture of some of your products too. Please write, phone or wire us.

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Arlington, New Jersey

DEVELOPING • DESIGNING • MACHINE WORK • SPINNING • WELDING • STAMPING • ELECTRICAL WORK



WHISPERING CAMPAIGN

Word of mouth travel has built up a list of almost 1,000 users of Strenes metal ranging over 36 states, employing this unusual alloy in many ways.

Its principal use is for drawing and forming dies . . . body tops, fenders, radiator grills, hoods, lamps . . . refrigerator tops, sides, doors, trays . . . stove parts, tractor parts, farm implement parts, caskets, grave vaults, etc.

Strenes can be cast very close to shape (usually $\frac{1}{16}$ "') . . . thereby greatly reducing machining time. Its graphitic lubrication rate is very high, hence runs of 1,000,000 deep draw parts are not unusual.

Here is an alloy you should look into and we are ready to cite hundreds of plants for you to contact on the subject.

Also . . . no matter how extensive your tooling program Advance has the capacity to handle the casting end and give you excellent service.



THE ADVANCE FOUNDRY CO.

100 Seminary Ave.,
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NEWS OF INDUSTRY

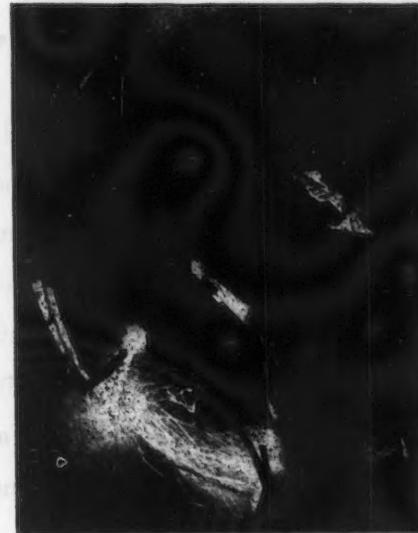
(Advertisement)

How to Arc Weld Galvanized Sheet, Shapes and Pipe

By GEORGE H. OHMER
Chief Engineer

Dayton

• • • That the Galv-Weld Process has overcome the greatest drawback to the use and fabrication of galvanized iron and steel, is recognized by foremost producers of mill galvanized sheet and pipe, and hot dip galvanizers. The shipbuilding, railroad, petroleum, air conditioning, electric power, and other industries, are employing Galv-Weld Alloy in ever increasing amount.



GALV-WELD PROCESS: Permits use of galvanized steel for underground storage tanks. Welds are protected from rust and soil corrosion.

The Galv-Weld Process makes it possible, for the first time, to weld and leave the entire galvanized structure 100% rust and corrosion proof. The process is fast, permanent, requires no flux, produces no fumes, and requires no sand or grit blasting. The coating will not chip, crack or peel. It can be applied in any position and in confined quarters, and its use is economical.

The burning of the galvanized coating during welding, and subsequent rusting of the weld and adjacent area, the problem of a large manufacturer of farm equipment, is typical of those solved by the Galv-Weld Process. Manufacturers can dispense with hot dip galvanizing operations and fabricate from mill supplied galvanized sheets and shapes, effecting additional economies.

The Galv-Weld Process has also obsoleted riveting and soldering as a means of assembly of galvanized sheet metal. The result is the elimination of the use of victory solder, which stands very little abuse.

Galv-Weld Alloy is fully approved for government work, having successfully passed salt spray, weathering and adhesion tests.

Details may be secured from Galv-Weld Products, Dayton 10, Ohio.

NEWS OF INDUSTRY

**Manufacturing Rate
Drops Once More In
Month of September**

New York

• • • Manufacturing activity eased off again in September after the downward trend, which began in March, was interrupted by an upturn in August, according to the Alexander Hamilton Institute.

For the fifth consecutive month, manufacturing activity in September was below the rate of a year ago. Production in September this year was 6.4 per cent lower than in the same month last year when the index was 267.

The cumulative output for 1944 to date has now dropped below the volume for the corresponding period of 1943. For the first nine months, the decrease from a year ago amounted to only 0.7 per cent, however, since gains during the first quarter of this year offset to a large extent the later curtailment.

It now seems fairly certain that factory output for the full year of 1944 will fail to attain the record high volume of 1943. Except for the 1943 output, however, production in 1944 will be the largest in history.

**Metals Safety Award
Goes to Bethlehem**

Bethlehem, Pa.

• • • Formal presentation of the 1944 first place trophy in the metals section, Group A, Steel Mills Division, Safety Contest of the National Safety Council was made to Bethlehem plant, Bethlehem Steel Co., at a dinner and ceremonies held here recently.

Ned H. Dearborn, president of the National Safety Council, presented the plaque. R. A. Lewis, general manager of the Bethlehem plant, accepted on behalf of management and men.

The award, which covered the fiscal year July 1, 1943, to June 30, 1944, was in recognition of the plant's lowest accident frequency rate in the group of 14 metal producing firms participating in the contest. The record was achieved with more than five million man hours of exposure per month, or better than five times the million hours required to qualify to be entered in this group.

The 1944 accident frequency rate was 1.29. In 1943 it was 1.53 and in 1941 it was 1.99. The Bethlehem plant was in second place in 1942.



If you use centerless-ground products, you will be interested in the photographs at the left, which show some of the centerless-ground products we have been making. Complete facilities are available at Oliver for the manufacture of such items—precision made in large or small quantities.

Other equipment for the manufacture of small parts includes screw machines, forging hammers, headers, threading equipment, heat treating apparatus and related facilities—all carefully supervised and manned by experienced personnel. We can provide also design engineering service if required.

SOUTH TENTH AND MURIEL STS. • PITTSBURGH 3, PA.

MACHINE TOOLS

... News and Market Activities

Cutting Tool Disposal Plan Ready

Washington

• • • Part of W. L. Clayton's report to War Mobilization Director Byrnes concerns a proposed plan for the disposal of large quantities of surplus cutting tools. The plan is reported to have the approval of the administration, and is awaiting approval of the Attorney General.

Discussing the plan for disposal of cutting tools, Mr. Clayton said that large quantities of these tools are and will continue to become surplus, largely as a result of contract terminations. Cutting tools, he explained, are precision articles in which small differences in quality, condition and specifications have a great effect on sales value and exact and expert knowledge is needed for a full appreciation of these factors. For that reason, it was stated, inexpert disposal would result both in large speculative profits and in a dislocation of the markets for cutting tools. The purpose of the plan was said to be to render these results impossible, to pro-

duce the maximum return for the Government and to maintain an orderly relationship between surplus disposal and new production.

Under the plan, any cutting tool manufacturer desiring to do so may become an agent of DPC. Cutting tools becoming available for disposal will be sent direct to the agent who manufactured them. The agent will inspect, inventory, store and do whatever is necessary to put the tools in first class condition at the expense of DPC. He will divide the tools into three categories — standard cutting tools, semi-special cutting tools and special cutting tools. He will then proceed to sell the government owned cutting tools on a percentage relation with the tools that he manufactures himself. Sales will be made through regular distributing channels at the same prices that the agent-manufacturer charges for his own tools. On sales of government owned tools, the agent-manufacturer will receive a commission specified in the agency contract.

to New York. Northern Trails holds an option to purchase Eastern Trails whose buses operate from New York to Philadelphia and Baltimore. The new syndicate will purchase substantial quantities of new equipment, it is reported.

Glossary of Foreign Welding Terms Available

• • • A glossary of foreign welding terms published by the American Welding Society is now available to supplement standard or engineering dictionaries. Contractors, students and others who may have occasion to consult welding drawings or specifications using German, French, Russian or Spanish terms will find the glossary valuable. Many of the terms for which English definitions or equivalents are given have been derived from foreign technical literature and are not found in any standard or technical dictionaries. The glossary, in the form of a paper-covered pamphlet of 16 pages, may be purchased for 50c. from the American Welding Society, 33 W. 39th Street, New York 18.

British Want Cut Rates

New York

• • • First indication of the government's policy in disposing of lend-lease equipment advanced to its Allies is revealed in final negotiations for more than \$110,000,000 worth of machine tools lend-leased to the British, the National Association of Manufacturers said recently.

The NAM weekly publication, *The News*, said the British have asked for terms under which title to the tools can be turned over to their factories.

The United States government, according to the NAM, is demanding that the English pay peace-time cash value for the tools, all of which must be purchased. "The British cannot cull out the more efficient tools to keep and return the worn-out, obsolescent tools to us," the article said.

The United States also is asking that none of the tools be re-exported without its consent, it added, and that "under no circumstances shall any of these tools ever be re-sold into the American markets."

The British contended they should

be charged only half the estimated value of the tools, the article said, because British machine tools formerly sold for about half the price of American tools.

American officials, however, cited the "lively demand" for American machine tools and said that the value of the machinery in the world market should be taken into consideration.

Formation of New Bus Line To Spur Equipment Inquiries

Chicago

• • • Initial moves in formation of another nation-wide bus system have been taken by Glore, Forgan & Co. and Kebbon, McCormick & Co., investment firms, who are reported to have formed a syndicate to buy All American Bus Lines, Inc.

All American operates in the middle west from Chicago to St. Louis, and through the Southwest to the Pacific Coast. It owns Northern Trails, which operates from Chicago to Toledo and Cleveland, and Pittsburgh

Labor Shortage Continues

Cincinnati

• • • Shortage of Labor and restrictions of materials are definite nightmares to district machine tool manufacturers. Scarcity of men is a direct result of the draft combined with the expansion of all manufacturing facilities. WMC is helping in this sphere but officials declare that the end of the labor supply is close. Material difficulties continue to hold back production since current priorities appear unable to obtain shipments. Peacetime ordering is reported active and while manufacturers are scheduling much of this business, priorities are not available to produce the machines so they continue in the category of potential business. Current war business indicates a continuing heavy backlog.

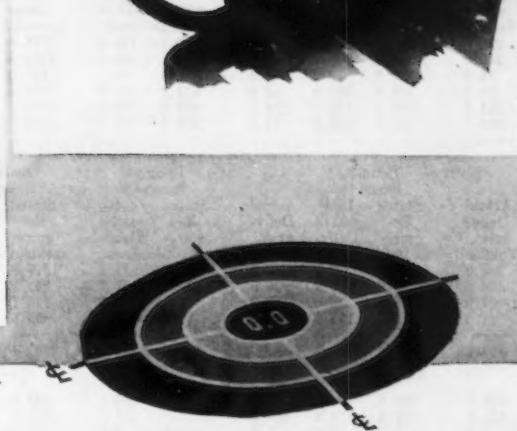
Youngstown's Net Down

• • • Youngstown Sheet & Tube Co. reports a profit for the third quarter of 1944 of \$1,818,768 as compared with \$2,098,786.72 for 1943. Net sales and revenues amounted to \$9,813,082.

Could you Mill this 14 Cavity Mold complete in 52 Hours?



Close-up view of cavities in the solid mold block.



Plastic shower-curtain hooks in multiple, as they come from the mold.

Photos — Courtesy The Kampa Manufacturing Co.

1000-P

This 14-cavity plastic mold is a "sticker" if you try to produce it by ordinary methods — but read this report of its production with the Milwaukee Rotary Head Milling Machine!

The Milwaukee Rotary Head method made it possible to set up both halves of this shower curtain hook mold on the machine table. One cavity of each shape was then laid out by means of a scribe held in the machine

spindle. Each milling operation was first performed on the location of the layout and then repeated for each additional cavity. Uniform and unvarying precision is repeated by this multiple origination of cavities with the Rotary Head Method. Total milling time complete — 52 hours.

Write for Bulletin 1002-C for full information on this unusual machine tool and the Rotary Head method of milling.

BUILDERS OF MILWAUKEE ROTARY HEAD MILLING
MACHINE • MIDGETMILL • SPEEDMILL • FACE MILL
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NON-FERROUS METALS

... News and Market Activities

Casting Quality Stressed to Founders

Chicago

• • • Purchasers of aluminum castings are more quality conscious than ever before, and this trend should continue after the war, Frank D. Chew, American Smelting & Refining Co., told the nonferrous division, Chicago Chapter, American Foundrymen's Assoc. last week. He stated that the Cast Cookware Assoc. is in the process of setting up quality standards, and that ingot makers are seeking means of improving their products. American Smelting & Refining Co. has adopted a vacuum pouring method in order to lessen the influence of gas in secondary ingots, a problem which has been particularly severe in high silicon alloys.

Chew stressed that over-heating of aluminum foundry mixtures should be

avoided in order to lower oxidation losses and to improve properties of the castings by refining their grain structure. He said that aluminum castings should be gated so as to be run into the molds at temperatures below 1300 deg. F. The use of nitrogen as a degassing agent was recommended because of its effectiveness at low temperatures—even down to 1250 deg. F.—at which the adsorption of hydrogen into the metal is low.

The precipitation of inclusions of iron, silicon and manganese, caused by hot spots in the melting pots is responsible for the development of hard spots in aluminum-magnesium castings. In order to avoid dross inclusions, a flux was recommended which consists of 40 per cent sodium chloride, 50 per cent potassium chlo-

ride and 10 per cent magnesium chloride. Molecular chlorine is liberated in the melt from this flux and serves to bring inclusions quickly to the surface where they may be skimmed off. Iron is often picked up from the melting pot when the heat is permitted to stand for several hours in order to permit the slow rise of inclusions without the use of a proper flux.

Zinc

• • • Stocks of slab zinc increased again in October according to figures released by the American Zinc Institute. The increase was moderate, however, only 775 tons, making a total of 244,209 net tons at the end of the month. October shows the first significant increase in shipments since the high in May. October shipments totaled 68,006 tons, an increase of nearly 3000 tons over last month.

Copper Requirements-Supply Position, Year 1944 — First Half 1945

Source: W.P.B. Copper Division

| Controlled Materials (Millions of Lbs.—Metal Weight) | Second Quarter | | | Third Quarter | | | Fourth Quarter | | | Total Year | | | First Quarter 1945 | | Second Quarter 1945 | |
|---|-------------------------------------|-----------------------------------|--------------------|-------------------------------------|-----------------------------------|--------------------|-------------------------------------|-----------------------------------|--------------------|-------------------------------------|--------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|--------|
| | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Actual Total(b) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Actual Total(c) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Actual Total(c) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries(d) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | |
| Brass Mill: | | | | | | | | | | | | | | | | |
| Alloy Strip | 990.1 | 906.0* | 920.5 | 882.4 | 807.0 | 733.3 | 890.1 | 700.0 | 3738.9 | 3274.0 | 804.1 | 720.0 | 804.1 | 720.0 | 804.1 | 720.0 |
| Alloy Rod | 303.9 | 245.0* | 249.3 | 314.3 | 248.6* | 247.0 | 330.7 | 265.0 | 1255.4 | 1005.1 | 325.4 | 270.0 | 325.4 | 270.0 | 325.4 | 270.0 |
| Alloy Tube | 101.9 | 80.0* | 78.6 | 105.5 | 79.0* | 78.5 | 114.3 | 85.0 | 425.0 | 318.3 | 106.0 | 90.0 | 106.0 | 90.0 | 106.0 | 90.0 |
| Copper Products | 136.7 | 95.0 | 99.3 | 126.8 | 102.0 | 88.0 | 123.9 | 100.0 | 524.3 | 376.4 | 129.5 | 105.0 | 129.5 | 105.0 | 129.5 | 105.0 |
| Wire Mill Products | 274.1 | 200.0* | 224.5 | 248.5 | 193.0* | 224.8 | 253.9 | 230.0* | 1045.3 | 885.2 | 256.8 | 235.0* | 256.8 | 235.0* | 256.8 | 235.0* |
| Foundry Products(e) | 457.6 | 415.0 | 405.3 | 338.7 | 345.0 | 311.0 | 354.2 | 310.0 | 1650.0 | 1449.9 | 359.3 | 323.4 | 359.3 | 323.4 | 359.3 | 323.4 |
| Raw Materials (Thousands of Short Tons— Copper Content) | | | | | | | | | | | | | | | | |
| Requirements | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Actual Total(b) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Actual Total(c) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Actual Total(c) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries(d) | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | Stated Re- quire- ments(a) | Esti- mated Deliv- eries | |
| Refined Copper: | | | | | | | | | | | | | | | | |
| Brass Mills | 329.5 | 285.1 | 283.6 | 307.2 | 265.9 | 237.9 | 313.7 | 247.3 | 1277.9 | 1055.1 | 293.5 | 254.8 | 293.5 | 254.8 | 293.5 | 254.8 |
| Wire Mills | 139.8 | 102.0 | 124.6 | 132.9 | 103.3 | 120.2 | 135.8 | 123.1 | 542.9 | 472.4 | 137.4 | 125.7 | 137.4 | 125.7 | 137.4 | 125.7 |
| Foundries (f) | 34.3 | 31.1 | 27.9 | 33.3 | 30.0 | 20.3 | 30.0 | 22.3 | 125.7 | 94.1 | 25.9 | 23.3 | 25.9 | 23.3 | 25.9 | 23.3 |
| Non-C.M.P. | 17.5 | 17.5 | 21.5 | 12.5 | 12.5 | 9.3 | 11.5 | 11.5 | 55.6 | 58.8 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 |
| Total Refined Copper Requirements | 521.1 | 435.7 | 457.6 | 485.9 | 411.7 | 387.7 | 491.0 | 404.2 | 2002.1 | 1680.4 | 468.3 | 415.3 | 468.3 | 415.3 | 468.3 | 415.3 |
| Scrap: | | | | | | | | | | | | | | | | |
| Brass Mills | 241.5 | 207.8 | 200.7 | 224.8 | 194.3 | 192.9 | 229.1 | 180.6 | 935.5 | 796.6 | 214.9 | 186.3 | 214.9 | 186.3 | 214.9 | 186.3 |
| Foundries (f) | 160.2 | 145.3 | 151.4 | 134.5 | 118.9 | 120.5 | 123.6 | 117.2 | 581.2 | 548.2 | 135.8 | 122.2 | 135.8 | 122.2 | 135.8 | 122.2 |
| Non-C.M.P. | 7.5 | 7.5 | 5.9 | 6.0 | 6.0 | 7.0 | 7.5 | 7.5 | 28.5 | 26.1 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| Total Scrap Requirements | 409.2 | 360.6 | 358.0 | 365.3 | 319.2 | 320.4 | 360.2 | 305.3 | 1545.2 | 1370.9 | 358.2 | 316.0 | 358.2 | 316.0 | 358.2 | 316.0 |
| Total Requirements | 930.3 | 796.3 | 815.6 | 851.2 | 730.9 | 708.1 | 851.2 | 709.5 | 3547.3 | 3051.3 | 826.5 | 731.3 | 826.5 | 731.3 | 826.5 | 731.3 |
| Supply | | | | | | | | | | | | | | | | |
| Total Refined Copper Production | 457.0 | 457.0 | 455.3 | 422.0 | 422.0 | 447.8 | 428.0 | 428.0 | 1771.0 | 1779.5 | 459.0 | 459.0 | 459.0 | 459.0 | 459.0 | 459.0 |
| Brass Mill Scrap Receipts | 241.5 | 207.8 | 195.1 | 224.8 | 194.3 | 181.1 | 229.1 | 180.6 | 935.5 | 763.5 | 214.9 | 186.3 | 214.9 | 186.3 | 214.9 | 186.3 |
| Other Scrap Receipts | 159.0 | 156.0 | 169.2 | 135.0 | 132.0 | 136.6 | 152.3 | 133.3 | 605.3 | 608.2 | 154.5 | 139.1 | 154.5 | 139.1 | 154.5 | 139.1 |
| Total Scrap Receipts | 400.5 | 363.8 | 364.3 | 359.8 | 326.3 | 317.7 | 381.4 | 313.9 | 1540.8 | 1371.7 | 369.4 | 325.4 | 369.4 | 325.4 | 369.4 | 325.4 |
| Total Supply | 857.5 | 820.8 | 819.6 | 781.8 | 748.3 | 765.5 | 809.4 | 741.9 | 3311.8 | 3151.2 | 828.4 | 784.4 | 828.4 | 784.4 | 828.4 | 784.4 |
| Surplus or Deficit | | | | | | | | | | | | | | | | |
| Refined Copper | 64.1† | 21.3 | 2.3† | 63.9† | 10.3 | 60.1 | 63.0† | 23.8 | 231.1† | 99.1 | 9.3† | 43.7 | 9.3† | 43.7 | 9.3† | 43.7 |
| Scrap | 8.7† | 3.2 | 6.3 | 5.5† | 7.1 | 2.7† | 21.2 | 8.6 | 4.4† | .8 | 11.2 | 9.4 | 11.2 | 9.4 | 11.2 | 9.4 |
| Total Surplus or Deficit | 72.8† | 24.5 | 4.0 | 69.4† | 17.4 | 57.4 | 41.8† | 32.4 | 235.5† | 99.9 | 1.9 | 53.1 | 1.9 | 53.1 | 1.9 | 53.1 |

(a) Represents requirements as submitted by claimants. (b) Final (includes all adjustments due to late reports). (c) Preliminary (subject to minor revisions). (d) Includes actual for first, second and third quarters, and estimates for fourth quarter. (e) Excludes railroad journal bearings and engine castings produced from railroad scrap on toll in third and fourth quarters, and production of Navy Yards and Naval Supply Depots in fourth quarter. (f) Includes Ingot Makers. (*) Represents maximum possible deliveries as limited by manpower and facilities on basis of present order pattern. (†) Deficit.

NON-FERROUS METALS PRICES

Primary Metals

(Cents per lb. unless otherwise noted)

| | |
|---|-------------------|
| Aluminum, 99+%, del'd. (Min. 10,000 lb.) | 15.00 |
| Antimony, American, Laredo, Tex. | 14.50 |
| Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be | \$17.00 |
| Cadmium, del'd. | 90.00 |
| Cobalt, 97-99% (per lb.) | \$1.50 to \$1.57 |
| Copper, electro, Conn. valley | 12.00 |
| Copper, electro, New York | 11.75 |
| Copper, lake | 12.00 |
| Gold, U. S. Treas., dollars per oz. | \$35.00 |
| Indium, 99.5%, dollars per troy oz. | \$4.50 |
| Iridium, dollars per troy oz. | \$165.00 |
| Lead, St. Louis | 6.35 |
| Lead, New York | 6.50 |
| Magnesium, 99.9 + %, carlots | 20.50 |
| Magnesium, 12-in. sticks, carlots | 27.50 |
| Mercury, dollars per 76-lb. flask, f.o.b. New York | \$108 to \$110.00 |
| Nickel, electro | 35.00 |
| Palladium, dollars per troy oz. | \$24.00 |
| Platinum, dollars per oz. | \$35.00 |
| Silver, open market, New York, cents per oz. | 44.75 |
| Tin, Straits, New York | 52.00 |
| Zinc, East St. Louis | 8.25 |
| Zinc, New York | 8.65 |

Remelted Metals

(Cents per lb. unless otherwise noted)

| | |
|-------------------------------|--------------|
| Aluminum, No. 12 Fdy. (No. 2) | 8.50 to 9.00 |
| Aluminum, deoxidizing | |
| No. 2, 3, 4 | 6.25 to 9.00 |
| Brass Ingots | |
| 85-5-5 (No. 115) | 13.25 |
| 88-10-2 (No. 215) | 16.75 |
| 80-10-10 (No. 305) | 16.00 |
| No. 1 Yellow (No. 405) | 10.25 |

Copper, Copper Base Alloys

(Mill base, cents per lb.)

| | Extruded | Rods | Sheets |
|--------------------------------------|----------|-------|--------|
| Copper | 20.87 | | 20.37 |
| Copper, H.R. | 17.37 | | |
| Copper drawn | 18.37 | | |
| Low brass, 80% | 20.40 | 20.15 | |
| High brass | | 19.48 | |
| Red brass, 85% | 20.61 | 20.36 | |
| Naval brass | 20.37 | 19.12 | 24.50 |
| Brass, free cut | | 15.01 | |
| Commercial bronze, 90% | 21.32 | 21.07 | |
| Commercial bronze, 95% | 21.53 | 21.28 | |
| Manganese bronze | 24.00 | | 28.00 |
| Phos. bronze, A, B, 5% | 36.50 | 36.25 | |
| Muntz metal | 20.12 | 18.87 | 22.75 |
| Everdur, Herculoy, Olympic or equal. | 25.50 | 26.00 | |
| Nickel silver, 5% | 28.75 | 26.50 | |
| Architect bronze | 19.12 | | |

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/2"); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing: 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper: 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price: 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagons: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NON-FERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

| | |
|---|-------|
| No. 1 wire, No. 1 heavy copper | 9.75 |
| No. 1 tinned copper wire, No. 1 tinned heavy copper | 9.75 |
| No. 2 wire, mixed heavy copper | 8.75 |
| Copper tuyeres | 8.75 |
| Light copper | 7.75 |
| Copper borings | 9.75 |
| No. 2 copper borings | 7.75 |
| Lead covered copper wire, cable | 6.00* |
| Lead covered telephone, power cable | 6.04 |
| Insulated copper | 5.10* |

OPA Group 2†

| | |
|------------------------------------|--------|
| Bell metal | 15.50 |
| High grade bronze gears | 13.25 |
| High grade bronze solids | 11.50* |
| Low lead bronze borings | 11.50* |
| Babbitt lined brass bushings | 13.00 |
| High lead bronze solids | 10.00* |
| High lead bronze borings | 10.00* |
| Red trolley wheels | 10.75 |
| Tinny (phosphor bronze) borings | 10.50 |
| Tinny (phosphor bronze) solids | 10.50 |
| Copper-nickel solids and borings | 9.25 |
| Bronze paper mill wire cloth | 9.50 |
| Aluminum bronze solids | 9.00 |
| Soft red brass (No. 1 composition) | 9.00 |
| Soft red brass borings (No. 1) | 9.00 |
| Gilding metal turnings | 8.50 |
| Contaminated gilded metal solids | 8.50 |
| Unlined standard red car boxes | 8.25 |
| Lined standard red car boxes | 7.75 |
| Cocks and faucets | 7.75 |
| Mixed brass screens | 7.75 |
| Red brass breakage | 7.50 |
| Old nickel silver solids, borings | 6.25 |
| Copper lead solids, borings | 6.25 |
| Yellow brass castings | 6.25 |
| Automobile radiators | 7.00 |
| Zincy bronze borings | 8.00 |
| Zincy bronze solids | 8.00 |

OPA Group 3†

| | |
|-------------------------------------|-------|
| Fired rifle shells | 8.25 |
| Brass pipe | 7.50 |
| Old rolled brass | 7.00 |
| Admiralty condenser tubes | 7.50 |
| Muntz metal condenser tubes | 7.00 |
| Plated brass sheet, pipe reflectors | 6.50 |
| Manganese bronze solids | 7.25* |
| Manganese bronze solids | 6.25* |
| Manganese bronze borings | 6.50* |
| Manganese bronze borings | 5.50* |

OPA Group 4†

| | |
|----------------|-------|
| Refinery brass | 4.75* |
|----------------|-------|

*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

| | |
|--|--------|
| Copper: Cast, elliptical, 15 in. and longer | 25 1/2 |
| Electrolytic, full size | 22 1/2 |
| cut to size | 30 1/2 |
| Rolled, oval, straight, 15 in. and longer | 23 1/4 |
| Curved | 24 1/4 |
| Brass Cast, 82-20, elliptical, 15 in. and longer | 23 1/2 |
| Zinc: Cast, 99.99, 16 in. and over | 16 1/4 |
| Nickel: 99% plus, cast | 47 |
| Rolled, depolarized | 48 |
| Silver: Rolled, 999 fine per Troy (1-9) oz., per oz. | 58 |

Chemicals

(Cents per lb., delivery from New York)

| | |
|--|--------------|
| Copper cyanide, tech., 100-lb. bbls. 1-5 | 5.65 |
| Copper sulphate, 99.5 crystals, bbls. | 13.00-13.50 |
| Nickel salts, single, 425-lb. bbls. | 34.00 |
| Silver cyanide, 100 oz. lots. | 40.82-41.125 |
| Sodium cyanide, 96% dom., 100-lb. dms. | 0.15 |
| Zinc cyanide, 100-lb. dms. | 33.00 |
| Zinc sulphate, 89% crystals, bbls. | 6.80 |

OPA Modifies Scrap Regulations

• • • Concerned over the unsettled condition of the scrap iron and steel market, OPA has relaxed some provisions of its scrap price regulations in the hope of stimulating a freer market. Under these revised regulations, MPR4 as amended Nov. 11, blast furnace and basic open hearth furnace melters may purchase the superior grades of electric furnace or foundry scrap at the same price levels as electric furnace and foundry operators. All limitations on the amount of freight a consumer can pay for scrap have been lifted. Previously, the seller of scrap located at a basing point could not ship away from that market area without reducing prices in direct proportion to the freight he absorbed, except for a small springboard, or he might sell to a buyer under allocation.

Hereafter, when a shipper invoices the different grades of scrap in one car, settlement may be made on the basis of the actual grades shipped. Previously, settlement for all mixed shipments had to be made at the price of the lowest-priced grade in the shipment. When the seller invoices only one grade, the consumer is permitted to settle on the basis of the actual grade removed from the car if the balance of the car is returned. If the buyer and seller agree that no part of the car is to be returned, then settlement may be made on the basis of the lowest-priced grade in the car.

Brokerage fees of 50c. per gross ton for brokerage services hereafter may be charged only where scrap is bought and sold at ceiling prices. The ceiling price for cut rails, 2 ft. and under, is reinstated at \$3 over the No. 1 heavy railroad melting steel ceiling.

Machine shops and forge shops hereafter will not be classified as consumers of steel scrap and may purchase scrap axles and other items for machining and reworking at ceiling prices provided for reusable products, instead of the lower iron and steel scrap ceilings.

PITTSBURGH—A considerably stronger market in practically all grades is evident here this week with prices advancing in every dealer item except cast grades, which are at ceilings, and rails. While sales of large volume are still absent, there has been considerably more

activity by a greater number of mills than heretofore. With the cold weather months facing mills and foundries and no visible let-up to war activities in Europe, substantial buying activity in scrap may develop within the next week or so. The firming of prices now substantiates past reports that the market had about hit bottom and any change would be upward.

CHICAGO—Although purchases have not taken place to justify revision of the current range of prices, there are definite indications of strength. Railroads have been successful in maintaining their position on No. 1 railroad heavy melting and related grades, and it now appears probable that no substantial tonnage will move locally at the quoted level of \$17.75. Price feelers have been put out by interests not now in the market, although there are no definite indications that this will be followed up with contracts. Basically, mill inventories continue on a comfortable basis. There is nothing to indicate that mills will be forced into making early commitments at high price levels.

DETROIT—A notable tone of strength underlaid the scrap market here this week, dispelling the uncertainty which has pervaded it for almost a month. Some belief was expressed that mills might shortly come into the market more heavily to cover winter requirements. Efforts to hurry lake shipments before the close of navigation probably were a factor also. An additional indication of strength was apparent disinclination of some dealers to sell at current quotations.

CINCINNATI—Dealers report the purchase of a quantity of heavy material by one of the district mills at a little better than quoted prices. This gives tangible basis to the stronger recent appearance of the market. Quotations on better grades are up 50c. a ton. Dealers express a more optimistic attitude toward general market conditions. Foundry grades, however, remain unchanged although activity is reported in these grades.

BUFFALO—Scrap prices were strengthened notably this week by return of the leading mill interest to the local market as a buyer after a lapse of two months. Contracts for approximately 10,000 tons at \$17 for No. 1 heavy melting, \$16 for No. 2 melting, \$15 for No. 2 bundles and \$9.50 for machine shop turnings lifted listings for these grades 50c. to \$1 a ton. Receipts of about 3000 tons of scrap by barge marked the fag end of the canal season, while 5000 tons arrived by lake from Duluth. At least three more cargoes are expected from Detroit and Duluth before navigation closes for the winter.

BOSTON—Heavy melting steel, borings and turnings prices have advanced

sharply under the stimulus of increased inquiry. Demand for shipyard steel is particularly brisk. More turnings moved the past week than in the previous month and the movement would have been greater were freight cars available. Gas purifiers continue to pay ceiling prices for chemical borings, but other consumers pay about 50c. a ton less.

NEW YORK—Some brokers and dealers in this area view current modifications of OPA scrap iron and steel restrictions as having little or no effect upon the scrap market at this time. Prices of all grades of scrap except cast have been selling well below ceilings and this would cause most of the modifications to remain inoperative. It is quite possible that the OPA anticipates a rise in price levels to ceilings, but the industry does not foresee this development in the near future. Prices of all grades of scrap remain this week at previous levels.

PHILADELPHIA—The scrap market here appears to be gaining strength. There is a strong demand from the leading consumer and moderate demand from the other mills. Shipments are slightly heavier, and calls for heavy breakable cast are increasing. Although a few dealers who foresee an increase in scrap prices are continuing to stockpile scrap, this practice has been largely discontinued since the limited flow of material into dealers' yards precludes their increasing their inventories while fulfilling consumer demands. The sale of one thousand tons of miscellaneous scrap at the Navy Yard on Nov. 10 brought \$9.17 a ton, 45c. higher than the price paid for similar material at the last previous sale. The only major price change this week is that of short shoveling turnings, down to \$11 to \$11.50 a gross ton.

BIRMINGHAM—Although it is not yet reflected in price increases, the scrap market here seems to have a strong undertone and a price advance soon is regarded as likely. Inventories in dealers yards have increased somewhat since mills in this area have been out of the market, but yards do not have large stocks.

ST. LOUIS—The market for scrap iron continues weak, and dealers are complaining that mills are not paying a sufficient amount to permit handling the material at present prices. Mills are out of the market, and are content to coast along on present inventories. Prices are unchanged. Missouri-Kansas-Texas has a list with 12 carloads closing Friday.

CLEVELAND—A little buying has been reported locally, with market movement so slight that no price changes are indicated. Dealers are not having any difficulty picking up scrap because of the amount of material in the yards, accumulated since the last major sale over three months ago. Concern over cancellations resulting from an unexpected end to the European war this year has been a definite factor in the lull here.

[Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4).]

PITTSBURGH

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. melting | \$16.00 to \$16.50 |
| RR. hvy. melting | 17.50 to 18.00 |
| No. 2 hvy. melting | 15.50 to 16.00 |
| RR. scrap rails | 21.50 |
| Rails 3 ft. and under | 23.50 |
| No. 1 comp'd sheets | 16.00 to 16.50 |
| Hand bldd. new shts. | 16.00 to 16.50 |
| Hvy. axle turn. | 16.50 to 17.00 |
| Hvy. steel forge turn. | 16.50 to 17.00 |
| Mach. shop turn. | 10.50 to 11.00 |
| Short shov. turn. | 13.00 to 13.50 |
| Mixed bor. and turn. | 10.50 to 11.00 |
| Cast iron borings | 12.00 to 12.50 |
| Hvy. break. cast | 16.50 plus frt. |
| No. 1 cupola | 20.00 plus frt. |
| RR. knuck. and coup. | 22.50 to 23.00 |
| RR. coil springs | 22.50 to 23.00 |
| Rail leaf springs | 22.50 to 23.00 |
| Rolled steel wheels | 22.50 to 23.00 |
| Low phos. billet crops | 23.50 to 24.00 |
| Low phos. | 19.00 to 20.00 |
| RR. malleable | 22.00 plus frt. |

CHICAGO

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. melting | \$16.25 to \$16.75 |
| No. 2 hvy. melting | 15.25 to 15.75 |
| No. 1 bundles | 15.25 to 15.75 |
| No. 2 dealers' bndls. | 14.25 to 14.75 |
| Galv. bundles (No. 3) | 12.25 to 12.75 |
| Mach. shop turn. | 7.50 to 8.00 |
| Short shoveling turn. | 8.00 to 8.50 |
| Cast iron borings | 8.00 to 8.50 |
| Mix. bor. & short turn. | 8.00 to 8.50 |
| Low phos. hvy. forge | 19.50 to 20.00 |
| Low phos. plates | 18.25 to 18.75 |
| No. 1 RR hvy. melting | 17.25 to 17.75 |
| Reroll rails | 21.25 |
| Cut rails, 3 ft. and under | 21.25 to 21.75 |
| Locomotive tires, cut | 18.75 to 19.25 |
| Cut bolsters & side frames | 18.25 to 18.75 |
| Angles & splice bars | 20.25 to 20.75 |
| No. 3 steel wheels | 18.25 to 18.75 |
| Couplers & knuckles | 19.00 to 19.50 |
| Miscellaneous rails | 19.25 to 19.75 |
| Agricul. malleable | 20.00 to 20.50 |
| RR. malleable | 21.00 to 21.50 |
| St'dard std. car axles | 23.00 to 23.50 |
| FOB shipping point | |
| No. 1 mach. cast | 20.00 |
| No. 1 agricul. cast | 20.00 |
| Cast iron car wheels | 20.00 |
| Hvy. breakable cast | 16.50 |
| RR. grade bars | 15.25 |
| Brake shoes | 15.25 |
| Stove plate | 19.00 |
| Clean auto cast | 20.00 |

CINCINNATI

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. melting | \$15.50 to \$16.00 |
| No. 2 hvy. melting | 14.50 to 15.00 |
| No. 1 bundles | 15.50 to 16.00 |
| No. 2 bundles | 13.50 to 14.00 |
| Mach. shop turn | 5.50 to 6.00 |
| Shoveling turn | 7.00 to 7.50 |
| Cast iron borings | 7.50 to 8.00 |
| Mixed bor. & turn | 6.00 to 6.50 |
| No. 1 cupola cast | 21.00 |
| Hvy. breakable cast | 16.50 |
| Low phos. plate | 20.00 to 21.00 |
| Scrap rails | 20.00 to 21.00 |
| Stove plate | 15.50 to 16.00 |

BOSTON

| Dealers' buying prices per gross ton, f.o.b. cars | |
|---|----------------|
| No. 1 hvy. melting | \$12.50 |
| No. 2 hvy. melting | 11.50 |
| Bundled skeleton | 11.50 |
| Turnings, shovellings | 4.50 to 5.50 |
| Turnings, regular | 4.50 to 5.50 |
| Mixed bor. & turn | 4.50 to 5.50 |
| Mixed alloy turn | 4.50 to 5.50 |
| Clean cast. chem. bor. | 12.50 to 14.15 |
| Delivered to f'dry. per gr. ton | |
| Breakable cast | 21.57 to 21.87 |
| Stove plate | 20.00 to 23.51 |
| Machinery cast, truck | 21.00 to 23.51 |

DETROIT

| Per gross ton, brokers' buying prices: | |
|--|--------------------|
| No. 1 hvy. melting | \$11.75 to \$12.25 |
| No. 2 hvy. melting | 11.75 to 12.25 |
| No. 1 bundles | 11.75 to 12.25 |
| New busheling | 11.75 to 12.25 |
| Mach. shop turn | 5.25 to 5.75 |
| Short shov. turn | 7.00 to 7.50 |
| Cast iron borings | 6.75 to 7.25 |
| Mixed bor. & turn | 5.25 to 5.75 |
| No. 1 cupola cast | 19.00 to 20.00 |
| Charging box cast | 14.50 to 15.50 |
| Hvy. breakable cast | 13.00 to 13.50 |
| Stove plate | 17.00 to 17.50 |
| Flashings | 11.75 to 12.25 |
| Low phos. plate | 14.00 to 15.00 |
| Automotive cast | 19.00 to 20.00 |

NEW YORK

| Dealers' buying prices, per gross ton, an cars: | |
|---|--------------------|
| No. 1 hvy. melting | \$11.00 to \$11.50 |
| No. 2 hvy. melting | 10.00 to 10.50 |
| Hyd. comp. black bundles | 9.00 to 9.50 |
| Hyd. comp. galv. bundles | 7.00 to 7.50 |
| Hvy. breakable cast | 16.50 |
| Charging box cast | 13.00 |
| No. 1 cupola cast | 20.00 |
| Clean auto cast | 20.00 |
| Unstrip. motor blks. | 17.50 |
| Stove plate | 19.00 |
| Clean chem. cast bor. | 14.25 |
| Mach. shop turn | 5.00 to 5.50 |
| Mixed bor. & turn | 5.00 to 5.50 |

BUFFALO

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. melting | \$16.50 to \$17.00 |
| No. 1 bundles | 15.50 to 16.00 |
| No. 2 bundles | 14.50 to 15.00 |
| No. 2 hvy. melting | 15.50 to 16.00 |
| Mach. shop turn | 9.00 to 9.50 |
| Shoveling turn | 11.00 to 11.50 |
| Cast iron borings | 10.00 to 10.50 |
| Mixed bor. & turn | 10.00 to 10.50 |
| No. 1 cupola cast | 20.80 to 22.50 |
| Stove plate | 19.80 to 21.50 |
| Low phos. plate | 21.75 |
| Scrap rails | 19.80 to 21.25 |
| Rails 3 ft. & under | 22.75 |
| RR. steel wheels | 23.75 |
| Cast iron car wheels | 20.00 |
| RR. coil & leaf sprgs. | 23.75 |
| RR. knuckles & coup. | 23.75 |
| RR. malleable | 22.00 |
| No. 1 busheling | 15.50 to 16.00 |

CLEVELAND

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. melting | \$15.00 to \$15.50 |
| No. 2 hvy. melting | 15.00 to 15.50 |
| Compressed sheet stl. | 15.00 to 15.50 |
| Drop forge flashings | 15.00 to 15.50 |
| No. 2 bundles | 14.50 to 15.00 |
| Mach. shop turn | 6.00 to 6.50 |
| Short shovel | 10.00 to 11.00 |
| No. 1 busheling | 14.50 to 15.00 |
| Steel axle turn | 14.50 to 15.00 |
| Low phos. billet and bloom crops | 20.00 to 21.00 |
| Cast iron borings | 10.00 to 11.00 |
| Mixed bor. & turn | 9.50 to 10.50 |
| No. 2 busheling | 13.00 to 13.50 |
| No. 1 machine cast | 20.00 plus frt. |
| Railroad cast | 20.00 plus frt. |
| Railroad grade bars | 15.25 |
| Stove plate | 19.00 plus frt. |
| RR. hvy. melting | 17.50 to 18.00 |
| Rails 3 ft. & under | 23.00 to 23.50 |
| Rails 18 in. & under | 24.25 to 24.75 |
| Rails for rerolling | 23.00 to 23.50 |
| Railroad malleable | 22.00 plus frt. |
| Elec. furnace punch | 18.00 to 19.00 |

SAN FRANCISCO

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. melting | \$16.00 to \$16.75 |
| RR. hvy. melting | 18.00 to 16.75 |
| No. 2 hvy. melting | 15.00 to 15.75 |
| No. 2 bales | 14.00 to 14.75 |
| No. 3 bales | 10.00 to 10.75 |
| Mach. shop turn | 7.00 |
| Elec. furn. 1 ft. under | 16.00 to 17.50 |
| No. 1 cupola cast | 20.00 to 22.00 |

LOS ANGELES

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. melting | \$15.00 to \$16.00 |
| No. 2 hvy. melting | 14.00 to 15.00 |
| No. 3 bales | 13.00 to 14.00 |
| Mach. shop turn | 5.00 |
| No. 1 cupola cast | 20.00 plus frt. |

SEATTLE

| Per gross ton delivered to consumer: | |
|--------------------------------------|------------------|
| No. 1 hvy. melting | \$13.50 |
| RR. hvy. melting | 13.50 |
| No. 3 bundles | 11.50 |
| Elec. furn. 1 ft. und. | \$16.00 to 17.00 |
| No. 1 cupola cast | 20.00 plus frt. |

Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

(Prices Are F.O.B. Major Basing Points)

| Flat Rolled Steel: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, | Pig Iron: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|--------------------------------|----------|---------|----------|----------|------------------------------------|----------|---------|----------|----------|
| (Cents Per Lb.) | 1944 | 1944 | 1944 | 1943 | (Per Gross Ton) | 1944 | 1944 | 1944 | 1943 |
| Hot rolled sheets | 2.10 | 2.10 | 2.10 | 2.10 | No. 2 fdy., Philadelphia | \$25.84 | \$25.84 | \$25.84 | \$25.84 |
| Cold rolled sheets | 3.05 | 3.05 | 3.05 | 3.05 | No. 2, Valley furnace | 24.00 | 24.00 | 24.00 | 24.00 |
| Galvanized sheets (24 ga.) | 3.50 | 3.50 | 3.50 | 3.50 | No. 2, Southern Cin'ti | 25.11 | 25.11 | 25.11 | 24.68 |
| Hot rolled strip | 2.10 | 2.10 | 2.10 | 2.10 | No. 2, Birmingham | 20.38 | 20.38 | 20.38 | 20.38 |
| Cold rolled strip | 2.80 | 2.80 | 2.80 | 2.80 | No. 2, foundry, Chicago† | 24.00 | 24.00 | 24.00 | 24.00 |
| Plates | 2.10 | 2.10 | 2.10 | 2.10 | Basic, del'd eastern Pa | 25.34 | 25.34 | 25.34 | 25.39 |
| Plates, wrought iron | 3.80 | 3.80 | 3.80 | 3.80 | Basic, Valley furnace | 23.50 | 23.50 | 23.50 | 23.50 |
| Stain's c.r. strip (No. 302) | 28.00 | 28.00 | 28.00 | 28.00 | Malleable, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| | | | | | Malleable, Valley | 24.00 | 24.00 | 24.00 | 24.00 |
| | | | | | L. S. charcoal, Chicago | 37.34 | 37.34 | 37.34 | 31.34 |
| | | | | | Ferromanganese‡ | 135.00 | 135.00 | 135.00 | 135.00 |

| Tin and Terne Plate: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|---------------------------------|----------|---------|----------|----------|
| (Dollars Per Base Box) | 1944 | 1944 | 1944 | 1943 |
| Tin plate, standard cokes | \$5.00 | \$5.00 | \$5.00 | \$5.00 |
| Tin plate, electrolytic . . . | 4.50 | 4.50 | 4.50 | 4.50 |
| Special coated mfg. terne . . . | 4.30 | 4.30 | 4.30 | 4.30 |

| Bars and Shapes: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|------------------------------|----------|---------|----------|----------|
| (Cents Per Lb.) | 1944 | 1944 | 1944 | 1943 |
| Merchant bars | 2.15 | 2.15 | 2.15 | 2.15 |
| Cold finished bars | 2.65 | 2.65 | 2.65 | 2.65 |
| Alloy bars | 2.70 | 2.70 | 2.70 | 2.70 |
| Structural shapes | 2.10 | 2.10 | 2.10 | 2.10 |
| Stainless bars (No. 302) | 24.00 | 24.00 | 24.00 | 24.00 |
| Wrought iron bars | 4.40 | 4.40 | 4.40 | 4.40 |

| Wire and Wire Products: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|-------------------------|----------|---------|----------|----------|
| (Cents Per Lb.) | 1944 | 1944 | 1944 | 1943 |
| Plain wire | 2.60 | 2.60 | 2.60 | 2.60 |
| Wire nails | 2.55 | 2.55 | 2.55 | 2.55 |

| Rails: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|-------------------------|----------|---------|----------|----------|
| (Dollars Per Gross Ton) | 1944 | 1944 | 1944 | 1943 |
| Heavy rails | \$40.00 | \$40.00 | \$40.00 | \$40.00 |
| Light rails | 40.00 | 40.00 | 40.00 | 40.00 |

| Semi-Finished Steel: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|------------------------------|----------|---------|----------|----------|
| (Dollars Per Gross Ton) | 1944 | 1944 | 1944 | 1943 |
| Rerolling billets | \$34.00 | \$34.00 | \$34.00 | \$34.00 |
| Sheet bars | 34.00 | 34.00 | 34.00 | 34.00 |
| Slabs, rerolling | 34.00 | 34.00 | 34.00 | 34.00 |
| Forging billets | 40.00 | 40.00 | 40.00 | 40.00 |
| Alloy blooms, billets, slabs | 54.00 | 54.00 | 54.00 | 54.00 |

| Wire Rods and Skelp: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|----------------------|----------|---------|----------|----------|
| (Cents Per Lb.) | 1944 | 1944 | 1944 | 1943 |
| Wire rods | 2.00 | 2.00 | 2.00 | 2.00 |
| Skelp | 1.90 | 1.90 | 1.90 | 1.90 |

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 173-181.

Composite Prices . . .

FINISHED STEEL

| | | |
|-----------------------------|-----------|-------|
| November 14, 1944 | 2.30837c. | a Lb. |
| One week ago | 2.30837c. | a Lb. |
| One month ago | 2.30837c. | a Lb. |
| One year ago | 2.25513c. | a Lb. |

| | HIGH | LOW | | HIGH | LOW | | HIGH | |
|----------------|------------------|-----|------------------|------|---------------|---------|---------------|---------|
| 1944 | 2.30837c., Sept. | 5 | 2.272349c., Jan. | 4 | \$23.61 | \$23.61 | \$19.17 | \$19.17 |
| 1943 | 2.25513c., | | 2.25513c., | | 23.61 | 23.61 | 19.17 | 19.17 |
| 1942 | 2.26190c., | | 2.26190c., | | 23.61 | 23.61 | 19.17 | 19.17 |
| 1941 | 2.43078c., | | 2.43078c., | | \$23.61, Mar. | 20 | \$23.45, Jan. | 2 |
| 1940 | 2.30467c., Jan. | 2 | 2.24107c., Apr. | 16 | 23.45, Dec. | 23 | 22.61, Jan. | 2 |
| 1939 | 2.35367c., Jan. | 3 | 2.26689c., May | 16 | 22.61, Sept. | 19 | 20.61, Sept. | 12 |
| 1938 | 2.58414c., Jan. | 4 | 2.27207c., Oct. | 18 | 23.25, June | 21 | 19.61, July | 6 |
| 1937 | 2.58414c., Mar. | 9 | 2.32263c., Jan. | 4 | 23.25, Mar. | 9 | 20.25, Feb. | 16 |
| 1936 | 2.32263c., Dec. | 28 | 2.05200c., Mar. | 10 | 19.74, Nov. | 24 | 18.73, Aug. | 11 |
| 1935 | 2.07642c., Oct. | 1 | 2.06492c., Jan. | 8 | 18.84, Nov. | 5 | 17.83, May | 14 |
| 1934 | 2.15367c., Apr. | 24 | 1.95757c., Jan. | 2 | 17.90, May | 1 | 16.90, Jan. | 27 |
| 1933 | 1.95578c., Oct. | 3 | 1.75836c., May | 2 | 16.90, Dec. | 5 | 13.56, Jan. | 3 |
| 1932 | 1.89196c., July | 5 | 1.83901c., Mar. | 1 | 14.81, Jan. | 5 | 13.56, Dec. | 6 |
| 1931 | 1.99626c., Jan. | 13 | 1.86586c., Dec. | 29 | 15.90, Jan. | 6 | 14.79, Dec. | 15 |
| 1930 | 2.25488c., Jan. | 7 | 1.97319c., Dec. | 9 | 18.21, Jan. | 7 | 15.90, Dec. | 16 |
| 1929 | 2.31773c., May | 28 | 2.26498c., Oct. | 29 | 18.71, May | 14 | 18.21, Dec. | 17 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index re-capitulated in Aug. 28, 1941, issue.

| Pig Iron: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|------------------------------------|----------|---------|----------|----------|
| (Per Gross Ton) | 1944 | 1944 | 1944 | 1943 |
| No. 2 fdy., Philadelphia | \$25.84 | \$25.84 | \$25.84 | \$25.84 |
| No. 2, Valley furnace | 24.00 | 24.00 | 24.00 | 24.00 |
| No. 2, Southern Cin'ti | 25.11 | 25.11 | 25.11 | 24.68 |
| No. 2, Birmingham | 20.38 | 20.38 | 20.38 | 20.38 |
| No. 2, foundry, Chicago† | 24.00 | 24.00 | 24.00 | 24.00 |
| Basic, del'd eastern Pa | 25.34 | 25.34 | 25.34 | 25.39 |
| Basic, Valley furnace | 23.50 | 23.50 | 23.50 | 23.50 |
| Malleable, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 24.00 |
| L. S. charcoal, Chicago | 37.34 | 37.34 | 37.34 | 31.34 |
| Ferromanganese‡ | 135.00 | 135.00 | 135.00 | 135.00 |

| Scrap: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|-------------------------------------|----------|---------|----------|----------|
| (Per Gross Ton) | 1944 | 1944 | 1944 | 1943 |
| Heavy melt'g steel, P'gh | \$16.25 | \$15.75 | \$16.25 | \$20.00 |
| Heavy melt'g steel, Phila. | 15.50 | 15.50 | 14.50 | 18.75 |
| Heavy melt'g steel, Ch'go | 16.50 | 16.50 | 17.50 | 18.75 |
| No. 1 hy. comp. sheet, Det. | 12.00 | 11.75 | 11.75 | 17.85 |
| Low phos. plate, Youngs'n | 17.75 | 17.75 | 18.00 | 22.50 |
| No. 1 cast, Pittsburgh | 20.00* | 20.00* | 20.00* | 20.00 |
| No. 1 cast, Philadelphia | 20.00* | 20.00* | 20.00* | 20.00 |
| No. 1 cast, Chicago | 20.00* | 20.00* | 20.00* | 20.00 |

*F.o.b. shipping point.

| Non-Ferrous Metals: | Nov. 14, | Nov. 7, | Oct. 10, | Nov. 16, |
|-----------------------------------|----------|---------|----------|----------|
| (Cents Per Lb. to Large Buyers) | 1944 | 1944 | 1944 | 1943 |
| Copper, electro., Conn | 12.00 | 12.00 | 12.00 | 12.00 |
| Copper, Lake | 12.00 | 12.00 | 12.00 | 12.00 |
| Tin (Straits), New York | 52.00 | 52.00 | 52.00 | 52.00 |
| Zinc, East St. Louis | 8.25 | 8.25 | 8.25 | 8.25 |
| Lead, St. Louis | 6.35 | 6.35 | 6.35 | 6.35 |
| Aluminum, Virgin, del'd | 15.00 | 15.00 | 15.00 | 15.00 |
| Nickel, electrolytic | 35.00 | 35.00 | 35.00 | 35.00 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 20.50 |
| Antimony, Laredo, Tex | 14.50 | 14.50 | 14.50 | 14.50 |

| SCRAP STEEL |
| --- |

Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire.

| Basing Point ↓ Product | DELIVERED TO | | | | | | | | | | | | | | | |
|--|-----------------|--------------|--------|----------------|--|---------|-----------------|------------------------|--|--------------------------|------------------------|---------------------------|------------------|-------------|------------------------|--|
| | Pitts- burgh | Chi- cago | Gary | Cleve- land | Birm- ingham | Buffalo | Youngs- town | Spar- rows Point | Granite City | Middle- town, Ohio | Gulf Ports, Cars | Pacific Ports, Cars | Detroit | New York | Phi- ladel- phia | |
| Hot Rolled Sheets | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.20¢ | 2.10¢ | 2.65¢ | 2.20¢ | 2.34¢ | 2.27¢ | | |
| Cold Rolled Sheets ¹ | 3.05¢ | 3.05¢ | 3.05¢ | 3.05¢ | | 3.05¢ | 3.05¢ | | 3.15¢ | 3.05¢ | 3.70¢ | 3.15¢ | 3.39¢ | 3.37¢ | | |
| Galvanized Sheets (24 gage) | 3.50¢ | 3.50¢ | 3.50¢ | | 3.50¢ | 3.50¢ | 3.50¢ | 3.50¢ | 3.60¢ | 3.50¢ | 4.05¢ | | 3.74¢ | 3.67¢ | | |
| Enameling Sheets (20 gage) | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | | 3.35¢ | 3.45¢ | 3.35¢ | | 4.00¢ | 3.45¢ | 3.71¢ | 3.67¢ | | |
| Long Ternes ² | 3.80¢ | 3.80¢ | 3.80¢ | | | | | | | | 4.55¢ | | 4.16¢ | 4.12¢ | | |
| Hot Rolled Strip ³ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | 2.75¢ | 2.20¢ | 2.46¢ | | | |
| Cold Rolled Strip ⁴ | 2.80¢ | 2.90¢ | | | 2.80¢ | | 2.80¢ | (Worcester = 3.00¢) | | | | 2.90¢ | 3.16¢ | | | |
| Cooperage Stock Strip | 2.20¢ | 2.20¢ | | | 2.20¢ | | 2.20¢ | | | | | | 2.56¢ | | | |
| Commodity C-R Strip | 2.95¢ | 3.05¢ | | 2.95¢ | | | 2.95¢ | (Worcester = 3.35¢) | | | | 3.05¢ | 3.31¢ | | | |
| Coke Tin Plate, Base Box | \$5.00 | \$5.00 | \$5.00 | | | | | | \$5.10 | | | | 5.30¢ | 5.32¢ | | |
| Electro Tin Plate, Box | \$4.50 | \$4.50 | \$4.50 | | | | | \$4.60 | | | | | | | | |
| Black Plate (29 gage) ⁵ | 3.05¢ | 3.05¢ | 3.05¢ | | | | | 3.15¢ | | | 4.05¢ ¹² | | 3.37¢ | | | |
| Mfg. Ternes, Special Box | \$4.30 | \$4.30 | \$4.30 | | | | | \$4.40 | | | | | | | | |
| Carbon Steel Bars | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | (Duluth = 2.25¢) | 2.50¢ | 2.80¢ | 2.25¢ | 2.49¢ | 2.47¢ | | |
| Rail Steel Bars ⁶ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | 2.50¢ | 2.80¢ | | | | | |
| Reinforcing (Billet) Bars ⁷ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | 2.50¢ | 2.55¢ ¹³ | 2.25¢ | 2.39¢ | | | |
| Reinforcing (Rail) Bars ⁷ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | 2.50¢ | c2.55¢ ¹³ | 2.25¢ | 2.47¢ | | | |
| Cold Finished Bars ⁸ | 2.65¢ | 2.65¢ | 2.65¢ | 2.65¢ | | | 2.65¢ | | | | | (Detroit = 2.70¢) | (Toledo = 2.80¢) | 2.99¢ | 2.97¢ | |
| Alloy Bars, Hot Rolled | 2.70¢ | 2.70¢ | | | | 2.70¢ | | | (Bethlehem, Massillon, Canton = 2.70¢) | | | 2.80¢ | | | | |
| Alloy Bars, Cold Drawn | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | 3.35¢ | | | | | | 3.45¢ | | | | |
| Carbon Steel Plates | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | | 2.10¢ | 2.10¢ | 2.35¢ | 2.45¢ | 2.65¢ | 2.32¢ | 2.29¢ | 2.15¢ | |
| Floor Plates | 3.35¢ | 3.35¢ | | | | | | | | 3.70¢ | 4.00¢ | | 3.71¢ | 3.67¢ | | |
| Alloy Plates | 3.50¢ | 3.50¢ | | | | | | (Coatesville = 3.50¢) | | | 3.95¢ | 4.15¢ | | 3.70¢ | 3.59¢ | |
| Structural Shapes | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | 2.10¢ | (Bethlehem = 2.10¢) | | 2.45¢ | 2.75¢ | | 2.27¢ | 2.215¢ | | |
| SPRING STEEL, C-R 0.26 to 0.50 Carbon | 2.80¢ | | | | 2.80¢ | | | | (Worcester = 3.00¢) | | | | | | | |
| 0.51 to 0.75 Carbon | 4.30¢ | | | | 4.30¢ | | | | (Worcester = 4.50¢) | | | | | | | |
| 0.76 to 1.00 Carbon | 6.15¢ | | | | 6.15¢ | | | | (Worcester = 6.35¢) | | | | | | | |
| 1.01 to 1.25 Carbon | 8.35¢ | | | | 8.35¢ | | | | (Worcester = 8.55¢) | | | | | | | |
| Bright Wire ¹⁴ | 2.60¢ | 2.60¢ | | | 2.60¢ | 2.60¢ | | (Worcester = 2.70¢) | (Duluth = 2.65¢) | 3.10¢ | | | 2.92¢ | | | |
| Galvanized Wire | | | | | Add proper size extra and galvanizing extra to Bright Wire base. | | | | | | | | | | | |
| Spring (High Carbon) | 3.20¢ | 3.20¢ | | | 3.20¢ | | | (Worcester = 3.30¢) | | | 3.70¢ | | | 3.52¢ | | |
| Steel Sheet Piling | 2.40¢ | 2.40¢ | | | | | 2.40¢ | | | | 2.95¢ | | | 2.72¢ | | |

EXCEPTIONS TO PRICE SCHED. NO. 6
 Slabs—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50. Blooms—Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Fgh. Steel Co. (reroll) \$38.25, (forging) \$44.25. Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth. Sheet bar—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio. Billets, Forging—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto; Phoenix Iron Co. \$47.00 mill. Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50. Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1 1/4 x 1 1/4) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich. Geneva Steel Co. \$58.64 f.o.b. Pac. C. Pgt. Steel Co. \$43.50.

Structural Shapes—Phoenix Iron Co. \$2.35 basing pts. (export) \$2.50 Phoenixville; Knoxville Iron Co. \$2.30 basing points. Rails—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., \$45 Pueblo. Hot Rolled Plate—Granite City Steel Co. \$2.65 mill; Knoxville Iron Co. \$2.25 basing pts.; Kaiser Co. and Geneva Steel Co. \$2.20 Pacific Ports; Central Iron and Steel Co. \$2.50 basing points; Granite City Steel Co. \$2.35 Granite City. Merchant Bars—W. Ames Co., 10 tons and over, \$2.85 mill; Eckels-Nye Steel Corp., \$2.50 basing pts. (rail steel) \$2.40; Phoenix Iron Co. \$2.40 basing pts.; Sweet Steel Co. (rail steel) \$2.35 mill; Joslyn Mfg. & Supply Co., \$2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar) \$2.35 Chicago; Knoxville Iron Co. \$2.30 basing pts. Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. \$2.75 f.o.b. Milton, Pa. Pipe Skel—Wheeling Steel Corp., Benwood, \$2.05 per cwt. Reinforcing Bars—W. Ames & Co., 10 tons and over, \$2.85 mill; Sweet Steel Co. (rail steel) \$2.35 mill; Columbia Steel Co. \$2.50 Pacific Ports. Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis. Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Conors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham. Hot Rolled Strip—Joslyn Mfg. & Supply Co. \$2.30 Chicago; Knoxville Iron Co. \$2.25 basing pts. Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., \$2.25 Parkersburg. Galvanized Sheets—Andrews Steel Co. \$3.75 basing pts.; Parkersburg Iron & Steel Co. \$3.85 Parkersburg; Apollo Steel Co. \$3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind. product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease. Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa. Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is \$2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Conors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co. \$2.30 Chicago; Knoxville Iron Co. \$2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., \$2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co. \$3.75 basing pts.; Parkersburg Iron & Steel Co. \$3.85 Parkersburg; Apollo Steel Co. \$3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind. product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is \$2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

| Cities | SHEETS | | | STRIP | | Plates 1/4 in. and heavier | Structural Shapes | BARS | | ALLOY BARS | | | |
|----------------|----------------------------|--------------------|-------------------------|--------------------|---------------------|-------------------------------------|----------------------|--------------------|------------------|------------------------------|--------------------------------------|------------------------------|--------|
| | Hot Rolled (10 gage) | Cold Rolled | Galvanized (24 gage) | Hot Rolled | Cold Rolled | | | Hot Rolled | Cold Finished | Hot Rolled, NE 8617-20 | Hot Rolled, NE 9442-45 Ann. | Cold Drawn, NE 8617-20 | |
| Philadelphia | 3.518 | 4.872 ⁴ | 5.018a | 3.922 | 4.772 | 3.805 | 3.666 | 3.822 | 4.072 | 5.966 | 7.066 | 7.272 | 8.322 |
| New York | 3.590 | 4.813 ³ | 5.010 | 3.974 ⁶ | 4.772 | 3.768 | 3.758 | 3.853 | 4.103 | 8.008 | 7.108 | 7.303 | 8.353 |
| Boston | 3.744 | 4.744 ⁹ | 5.224 ⁹ | 4.106 | 4.715 | 3.912 | 3.912 | 4.044 | 4.144 | 6.162 | 7.262 | 7.344 | 8.394 |
| Baltimore | 3.394 | 4.852 | 4.894 | 3.902 | 4.752 | 3.594 | 3.759 | 3.802 | 4.052 | ... | ... | ... | ... |
| Norfolk | 3.771 | 4.965 | 5.371 | 4.165 | 4.885 | 3.971 | 4.002 | 4.065 | 4.165 | ... | ... | ... | ... |
| Chicago | 3.25 | 4.20 | 5.231 | 3.60 | 4.651 ⁷ | 3.55 | 3.55 | 3.50 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| Milwaukee | 3.387 | 4.337 ³ | 5.272 ⁴ | 3.737 | 4.7971 ⁷ | 3.687 | 3.687 | 3.637 | 3.887 | 5.987 | 7.087 | 7.087 | 8.137 |
| Cleveland | 3.35 | 4.40 | 4.877 ⁴ | 3.60 | 4.45 | 3.40 | 3.588 | 3.35 | 3.75 | 5.966 | 7.056 | 6.85 | 7.90 |
| Buffalo | 3.35 | 4.40 | 4.754 | 3.819 | 4.869 | 3.63 | 3.40 | 3.35 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| Detroit | 3.45 | 4.50 | 5.004 ⁶ | 3.70 | 4.5591 ⁷ | 3.609 | 3.661 | 3.45 | 3.80 | 6.08 | 7.18 | 7.159 | 8.208 |
| Cincinnati | 3.425 | 4.475 ³ | 4.825 ⁶ | 3.675 | 4.711 | 3.611 | 3.691 | 3.611 | 4.011 | ... | ... | ... | ... |
| St. Louis | 3.397 | 4.347 ³ | 5.172 ⁴ | 3.747 | 4.9311 ⁷ | 3.687 | 3.687 | 3.647 | 4.031 | 6.131 | 7.231 | 7.231 | 8.281 |
| Pittsburgh | 3.35 | 4.40 | 4.75 | 3.60 | 4.45 | 3.40 | 3.40 | 3.35 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| St. Paul | 3.51 | 4.48 | 5.257 ⁴ | 3.86 | 4.351 ⁷ | 3.811 ³ | 3.811 ³ | 3.761 ³ | 4.361 | 6.09 | 7.19 | 7.561 | 8.711 |
| Omaha | 3.865 | 5.443 | 5.608 ⁴ | 4.215 | 4.165 | 4.165 | 4.165 | 4.115 | 4.43 | ... | ... | ... | ... |
| Indianapolis | 3.58 | 3.58 | 4.588 | 4.918 | 3.768 | 4.78 | 3.83 | 3.98 | 8.08 | 7.18 | 7.18 | 8.23 | ... |
| Birmingham | 3.45 | 4.75 | 3.70 | ... | 3.55 | 3.55 | 3.50 | 4.43 | ... | ... | ... | ... | ... |
| Memphis | 3.965 ⁷ | 4.86 | 3.265 | 4.215 | 4.065 | 4.065 | 4.015 | 4.33 | ... | ... | ... | ... | ... |
| New Orleans | 4.058 ⁶ | 4.95 | 5.358 | 4.308 | 4.158 | 4.158 ⁹ | 4.108 ⁹ | 4.629 | ... | ... | ... | ... | ... |
| Houston | 3.763 | 5.573 | 6.313 ³ | 4.313 | 4.25 | 4.25 | 3.75 | 6.373 ³ | 7.223 | 8.323 | 8.323 | 8.373 | ... |
| Los Angeles | 5.00 | 7.20 ³ | 6.104 | 4.95 | 5.6131 ⁵ | 4.98 | 4.65 | 4.40 | 5.583 | 8.304 | 9.404 | 9.404 | 10.484 |
| San Francisco | 4.551 ⁴ | 7.304 | 6.354 ⁶ | 4.5014 | 7.3331 ⁷ | 4.681 ⁴ | 4.351 ⁴ | 4.151 ⁴ | 5.333 | 8.304 | 9.404 | 9.404 | 10.484 |
| Seattle | 4.651 ² | 7.054 | 5.954 | 4.2512 | 4.751 ² | 4.451 ² | 4.351 ² | 5.783 | ... | ... | ... | ... | ... |
| Portland | 4.651 ¹ | 6.804 | 5.754 | 4.751 ¹ | 4.751 ¹ | 4.451 ¹ | 4.451 ¹ | 5.533 | 8.304 | 9.404 | 9.404 | 9.404 | 9.404 |
| Salt Lake City | 4.651 ⁷ | ... | 6.171 ⁸ | 5.631 ⁷ | 4.901 ⁷ | 4.901 ⁷ | 4.881 ⁷ | 5.90 | ... | ... | ... | ... | ... |

MILL EXTRAS FOR NATIONAL EMERGENCY STEELS

| Designa- tion | Basic Open-Hearth | | Electric Furnace | | Designa- tion | Basic Open-Hearth | | Electric Furnace | |
|------------------|-----------------------|----------------------------------|-----------------------|----------------------------------|------------------|-----------------------|----------------------------------|-----------------------|----------------------------------|
| | Bars and Bar-Strip | Billets, Blooms, and Slabs | Bars and Bar-Strip | Billets, Blooms, and Slabs | | Bars and Bar-Strip | Billets, Blooms, and Slabs | Bars and Bar-Strip | Billets, Blooms, and Slabs |
| NE 1330 | 0.10 ⁶ | \$2.00 | ... | ... | NE 9415 | 0.75 ⁶ | \$15.00 | \$1.25 | \$25.00 |
| NE 1335 | 0.10 | 2.00 | ... | ... | NE 9417 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 1340 | 0.10 | 2.00 | ... | ... | NE 9420 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 1345 | 0.10 | 2.00 | ... | ... | NE 9422 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 1350 | 0.10 | 2.00 | ... | ... | NE 9425 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8612 | 0.65 ⁴ | \$13.00 | \$1.15 | \$23.00 | NE 9430 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8615 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9432 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8617 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9435 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8620 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9437 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8622 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9440 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8625 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9442 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8627 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9447 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8630 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9450 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8632 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9474 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8635 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9722 | 0.65 ⁴ | \$13.00 | \$1.15 | \$23.00 |
| NE 8637 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9727 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8640 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9732 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8642 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9735 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8645 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9742 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8647 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9745 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8660 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9747 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8712 | 0.70 ⁶ | \$14.00 | \$1.20 | \$24.00 | NE 9763 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8715 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9768 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8717 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9772 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8720 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9830 | \$1.30 | \$26.00 | \$1.80 | \$36.00 |
| NE 8722 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9832 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8725 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9835 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8727 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9837 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8730 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9840 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8732 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9842 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8735 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9842 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8737 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9845 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8740 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9847 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8742 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9850 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8745 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9912 | \$1.20 | \$24.00 | \$1.55 | \$31.00 |
| NE 8747 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9915 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 8750 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9917 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 8255 | 0.40 ⁶ | \$8.00 | ... | ... | NE 9920 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 8260 | 0.40 | 8.00 | ... | ... | NE 9922 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 8261 | 0.65 | 13.00 | ... | ... | NE 9925 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 8262 | 0.65 | 13.00 | ... | ... | NE 52100A | ... | ... | \$2.60 | \$52.00 |
| | | | | | NE 52100B | ... | ... | 2.60 | 52.00 |
| | | | | | NE 52100C | ... | ... | 2.60 | 52.00 |

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip, and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

| LAKE SUPERIOR ORES | |
|--|---------|
| (51.50% Fe, Natural Content, Delivered Lower Lake Ports*) | |
| Per Gross Ton | |
| Old range, bessemer, 51.50 | |
| Old range, non-bessemer, 51.50 | |
| Mesaba, bessemer, 51.50 | |
| Mesaba, non-bessemer, 51.50 | |
| High phosphorus, 51.50 | |
| *Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories. | |
| FLUORSPAR | |
| Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower. | |
| Exception | |
| When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above. | |
| Effective CaF ₂ Content: Base price per short ton | |
| 70% or more | \$33.00 |
| 65% but less than 70% | \$22.00 |
| 60% but less than 65% | \$31.00 |
| Less than 60% | \$30.00 |

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill... \$31.00
Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown... \$36.00
Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh... \$45.00
Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Per Gross Ton

Rerolling... \$34.00
Forging quality... 40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton... \$54.00
Price delivered Detroit \$2.00 higher; E. Michigan, \$3.00 higher.

Shell Steel

Per Gross Ton

3 in. to 12 in. \$52.00
12 in. to 18 in. 54.00
18 in. and over 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ontario, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

Per Gross Ton

Open hearth or bessemer... \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared... 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland... 2.00c.
Worcester, Mass. 2.10c.
Birmingham... 2.00c.
San Francisco... 2.50c.
Galveston... 2.25c.
9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

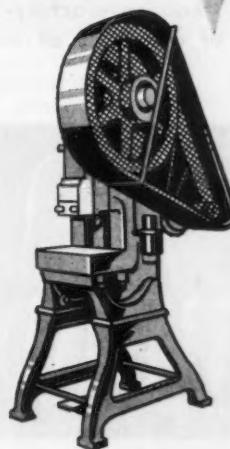
Base per lb.

High speed... 67c.
Straight molybdenum... 54c.
Tungsten-molybdenum... 57 1/2c.
High-carbon-chromium... 43c.
Oil hardening... 24c.
Special carbon... 22c.
Extra carbon... 18c.
Regular carbon... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

PUT A STOP TO COSTLY PUNCH PRESS VIBRATION TRANSMISSION with KORFUND

VIBRATION CONTROL

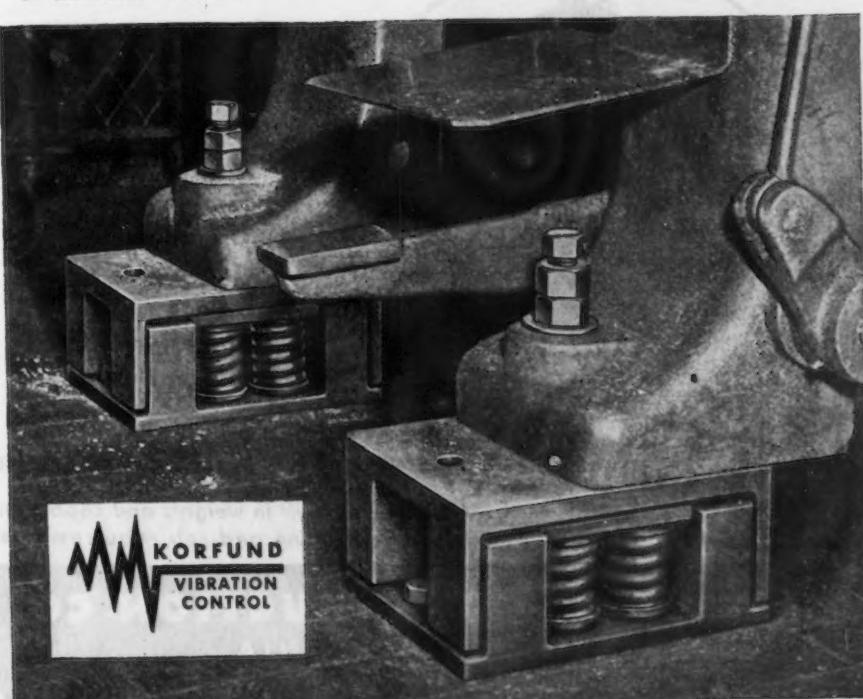


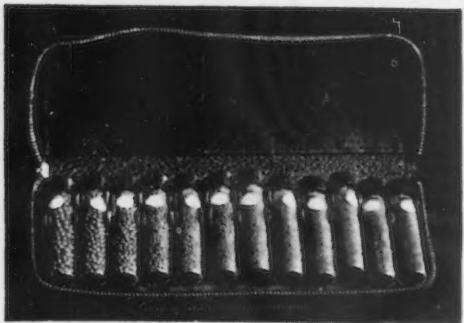
In many plants today punch press vibration is exacting a high price . . . in building maintenance . . . in machine repairs and replacements . . . in lowered employee efficiency . . . in high accident rates . . . and in rejections of work being done on nearby precision machines. Punch press vibration is an expensive "luxury" that few plants can afford.

Transmission of vibration can be stopped completely with Korfund Vibration Control. This low-cost improvement in plant efficiency will pay for itself many times over in the peace-time, competitive-manufacturing days ahead.

Write for four-page bulletin describing the new Type SL Vibro Isolator, latest development in anti-vibration engineering. A free copy will be sent to you without obligation.

THE KORFUND COMPANY, INC.
48-35 Thirty-second Place, Long Island City 1, N. Y.
Representatives in Principal Cities





HEAT-TREATED STEEL SHOT

We manufacture
shot and grit for
endurance

A shot or grit that will blast fast with a clean finish.

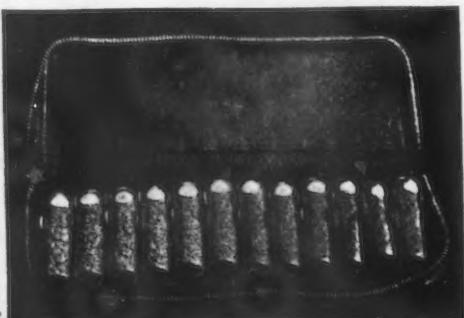
This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

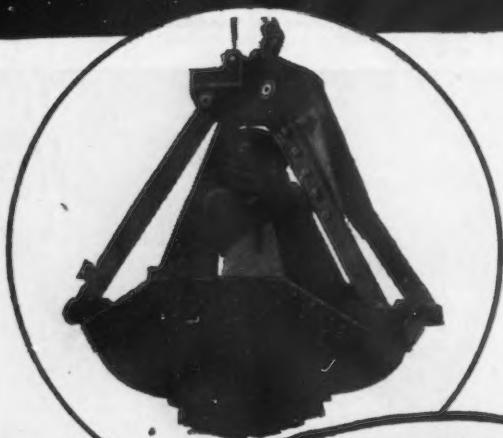
**HARRISON
ABRASIVE
CORPORATION**

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT



ERIE BUCKETS



THE COMPLETE LINE

Write for Data

Above types built in weights and capacities
to suit your crane and job requirements.

ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

Aggregates • Buckets • Concrete Plants • Traveling Cranes

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200.00 per Net Ton

Steel (Butt Weld)

| | Black | Galv. |
|------------|--------|--------|
| 1/2 in. | 63 1/2 | 51 |
| 3/4 in. | 66 1/2 | 55 |
| 1 to 3 in. | 68 1/2 | 57 1/2 |

Wrought Iron (Butt Weld)

| | | |
|---------------|--------|--------|
| 1/2 in. | 24 | 3 1/4 |
| 3/4 in. | 30 | 10 |
| 1 and 1/4 in. | 34 | 16 |
| 1 1/2 in. | 38 | 18 1/4 |
| 2 in. | 37 1/2 | 18 |

Steel (Lap Weld)

| | | |
|-----------------|----|--------|
| 2 in. | 61 | 49 1/4 |
| 2 1/2 and 3 in. | 64 | 52 1/4 |
| 3 1/2 to 6 in. | 66 | 54 1/4 |

Wrought Iron (Lap Weld)

| | | |
|--------------------|--------|--------|
| 2 in. | 30 1/2 | 12 |
| 2 1/2 to 3 1/2 in. | 31 1/2 | 14 1/4 |
| 4 in. | 33 1/2 | 18 |
| 4 1/2 to 8 in. | 32 1/2 | 17 |

Steel (Butt, extra strong, plain ends)

| | | |
|------------|--------|--------|
| 1/2 in. | 61 1/2 | 50 1/4 |
| 3/4 in. | 65 1/2 | 55 1/4 |
| 1 to 3 in. | 67 | 57 |

Wrought Iron (Same as Above)

| | | |
|------------|----|--------|
| 1/2 in. | 25 | 6 |
| 3/4 in. | 31 | 12 |
| 1 to 2 in. | 38 | 19 1/2 |

Steel (Lap, extra strong, plain ends)

| | | |
|-----------------|--------|--------|
| 2 in. | 59 | 48 1/4 |
| 2 1/2 and 3 in. | 63 | 52 1/4 |
| 3 1/2 to 6 in. | 66 1/2 | 56 |

Wrought Iron (Same as Above)

| | | |
|----------------|--------|--------|
| 2 in. | 33 1/2 | 15 1/4 |
| 2 1/2 to 4 in. | 39 | 22 1/4 |
| 4 1/2 to 6 in. | 37 1/2 | 21 |

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

Per Net Ton

| | |
|--|---------|
| 6-in. and larger, del'd Chicago | \$54.30 |
| 6-in. and larger, del'd New York | 52.30 |
| 6-in. and larger, Birmingham | 46.00 |
| 6-in. and larger f.o.b. cars, San Francisco or Los Angeles | 69.40 |
| 6-in. and larger f.o.b. cars, Seattle | 71.30 |
| Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3% per cent tax on freight rates. | |

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

| | Seamless | Lap |
|--------------------------|----------|-------|
| 2 in. o.d. 13 B.W.G. | 15.03 | 13.04 |
| 2 1/2 in. o.d. 12 B.W.G. | 20.21 | 17.54 |
| 3 in. o.d. 12 B.W.G. | 22.48 | 19.50 |
| 3 1/2 in. o.d. 11 B.W.G. | 28.37 | 24.62 |
| 4 in. o.d. 10 B.W.G. | 35.20 | 30.54 |

(Extras for less carload quantities)

| | |
|--|------|
| 40,000 lb. or ft. and over | Base |
| 30,000 lb. or ft. to 39,999 lb. or ft. | 5% |
| 20,000 lb. or ft. to 29,999 lb. or ft. | 10% |
| 10,000 lb. or ft. to 19,999 lb. or ft. | 20% |
| 5,000 lb. or ft. to 9,999 lb. or ft. | 30% |
| 2,000 lb. or ft. to 4,999 lb. or ft. | 45% |
| Under 2,000 lb. or ft. | 65% |

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

| | Pacific Coast Points | Base per Keg |
|---------------------------|----------------------------|--------------|
| Standard wire nails | \$2.55 | \$3.05 |
| Coated nails | 2.55 | 3.05 |
| Cut nails, carloads | 3.85 | ... |
| | Base per 100 lb. | |
| Annealed fence wire | \$3.05 | \$3.55 |
| Annealed galv. fence wire | 3.40 | 3.90 |
| | Base Column | |
| Woven wire fence* | .67 | .85 |
| Fence posts, carloads | .69 | .86 |
| Single loop bale ties | .59 | .84 |
| Galvanized barbed wire** | .70 | .80 |
| Twisted barbless wire | .70 | ... |

*15 1/2 gage and heavier. **On 80-rod spools in carload quantities.

Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

| | Per Cent Off List |
|--------------------------------------|-------------------|
| 5/16 in. & smaller x 6 in. & shorter | 65 1/2 |
| 5/16 & 3/4 in. x 6 in. & shorter | 63 1/2 |
| 1 to 1 in. x 6 in. & shorter | 61 |
| 1 1/4 in. and larger, all lengths | 59 |
| All diameters over 6 in. long | 59 |
| Lag, all sizes | 62 |
| Plow bolts | 65 |

Nuts, Cold Punched or Hot Pressed: (Hexagon or Square)

| | |
|--|----|
| 1/4 in. and smaller | 62 |
| 5/16 to 1 in. inclusive | 59 |
| 1 1/4 to 1 1/2 in. inclusive | 57 |
| 1 1/2 in. and larger | 56 |
| On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments. | |

| | U.S.S. S.A.E. |
|--|---------------|
| Base discount less keg lots | |
| 7/16 in. and smaller | 64 |
| 1/4 in. and smaller | 62 |
| 1/4 in. through 1 in. | 60 |
| 5/16 in. through 1 1/2 in. | 59 |
| 1 1/4 in. and larger | 57 |
| In full keg lots, 10 per cent additional discount. | 56 |

Stove Bolts

| | Consumer |
|---------------------------------|------------|
| Packages, nuts loose | .71 and 10 |
| In packages, with nuts attached | .71 |
| In bulk | .80 |

On stove bolts freight allowed up to 10c per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

| | Base per 100 Lb. |
|---|------------------|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | \$3.75 |

Small Rivets

| | Per Cent Off List |
|---|-------------------|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | 65 and 5 |

| | Consumer |
|---|-------------------|
| Cap and Set Screws | Per Cent Off List |
| Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. | 64 |
| Upset set screws, cup and oval points | 71 |
| Milled studs | 46 |
| Flat head cap screws, listed sizes | 36 |
| Pillister head cap, listed sizes | 51 |
| Freight allowed up to 65c per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over. | |

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

| | 20x14 in | 20x28 in. |
|---------------------|----------|-----------|
| 8-lb. coating I.C. | \$6.00 | \$12.00 |
| 18-lb. coating I.C. | 7.00 | 14.00 |
| 30-lb. coating I.C. | 7.50 | 15.00 |

HOW TO HANDLE SCRAP

Faster



Handle the load ONCE! KRANE KAR lifts, transports, and positions it. No need to maneuver the vehicle . . . swing the "live" boom from side to side and raise or lower it, by power, with the full load on the magnet. For loading and unloading scrap at freight cars, handling bulky items around the yards, working at the scrap piles. Safe, fast, flexible, easy to operate. Write for literature.

USERS: Carnegie-Illinois; Bethlehem; Republic; General Motors; Consolidated; American Smelting & Refining; Lima Locomotive Wks.; etc.

See our Exhibit at the POWER SHOW, Madison Square Garden, N. Y.—Space 628—November 27th—December 2nd

THE ORIGINAL SWING BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER



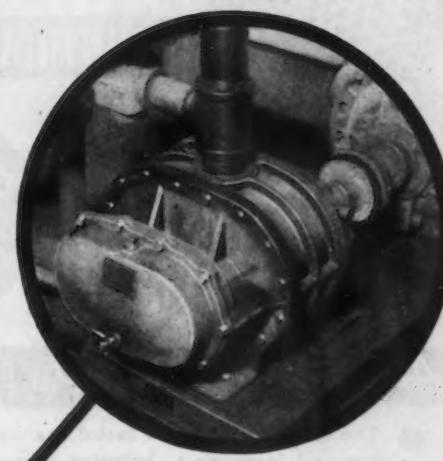
2 1/2, 5, AND 10 TON CAPACITIES

KRANE KAR
SILENT HOIST & CRANE CO., 851 63RD ST., BROOKLYN 20, N.Y.

FINGER-TIGHT Stuffing Boxes

The special construction of Roots-Connersville Gas Pump headplates includes a feature that has been used on our larger gas boosters for many years. The packing is vented to the suction or inlet side of the pump, thus placing the packing under low pressure or suction, instead of the higher discharge pressure.

This is an important feature where it is desirable to prevent contact of the gas with the lubricant, or where external leakage of the gas might be dangerous. Another advantage is that the packing and shafts are subject to less wear and friction since the stuffing box gland need not be drawn so tight. Write for Bulletin 31-B-15.



ROOTS-CONNERSVILLE BLOWER CORP.

411 Ohio Ave., Connorsville, Ind.



"R-C" Positive Displacement Gas Pump installed in steel mill. This unit delivers 102 c.f.m. of nitrogen against 2 lbs. pressure. Direct connected to 900 r.p.m. motor.

BLOWERS and GAS PUMPS

★ BUY BONDS ★ ★ GIVE BLOOD ★

PRICES

PIG IRON

All prices set in bold face type are maximum established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maximum. Delivered prices do not reflect 3 per cent tax on freight rates.

| | No. 2 Foundry | Basic | Bessemer | Malleable | ow Phos- phorus | Charcoal |
|----------------------------|------------------|---------|----------|-----------|--------------------|----------|
| Boston..... | \$25.50 | \$25.00 | \$26.50 | \$26.00 | ..... | ..... |
| Brooklyn..... | 27.50 | 27.00 | ..... | 28.00 | ..... | ..... |
| Jersey City..... | 26.53 | 26.03 | 27.53 | 27.03 | ..... | ..... |
| Philadelphia (4)..... | 25.84 | 25.34 | 26.84 | 26.34 | \$30.74 | ..... |
| Bethlehem, Pa. | \$25.00 | \$24.50 | \$28.00 | \$25.50 | ..... | ..... |
| Everett, Mass. | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Swedenland, Pa. | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Steelton, Pa. .... | ..... | 24.50 | ..... | ..... | \$29.50 | ..... |
| Girardown, Pa. (3)..... | 25.00 | 24.50 | 26.00 | 25.50 | 29.50 | ..... |
| Sparrows Point, Md. | 25.00 | 24.50 | ..... | ..... | ..... | ..... |
| Erie, Pa. | 24.00 | 23.50 | 25.00 | 24.50 | ..... | ..... |
| Neville Island, Pa. | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Sharpsville, Pa. (1)..... | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Buffalo..... | 24.00 | 23.00 | 25.06 | 24.50 | 29.50 | ..... |
| Cincinnati, Ohio..... | 25.11 | 24.61 | ..... | 25.11 | ..... | ..... |
| Canton, Ohio..... | 25.39 | 24.89 | 25.89 | 25.39 | 32.69 | ..... |
| Manfield, Ohio..... | 25.94 | 25.44 | 26.44 | 25.94 | 32.86 | ..... |
| St. Louis..... | 24.50 | 24.50 | ..... | ..... | ..... | ..... |
| Chicago..... | 24.00 | 23.50 | 24.50 | 24.00 | 35.46 | \$37.34 |
| Granite City, Ill. | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Cleveland..... | 24.00 | 23.50 | 24.50 | 24.00 | 32.42 | ..... |
| Hamilton, Ohio..... | 24.00 | 23.50 | ..... | 24.00 | ..... | ..... |
| Toledo..... | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Youngstown..... | 24.00 | 23.50 | 24.50 | 24.00 | 32.42 | ..... |
| Detroit..... | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Lake Superior Fe. .... | ..... | ..... | ..... | ..... | 34.00 | ..... |
| Lyles, Tenn., Fe. (2)..... | ..... | ..... | ..... | ..... | 33.00 | ..... |
| St. Paul..... | 26.63 | 26.13 | 27.1 | 26.63 | 39.80 | ..... |
| Duluth..... | 24.50 | 24.00 | 25.00 | 24.50 | ..... | ..... |
| Birmingham..... | 20.38 | 19.00 | 25.00 | ..... | ..... | ..... |
| Los Angeles..... | 26.95 | ..... | ..... | ..... | ..... | ..... |
| San Francisco..... | 26.95 | ..... | ..... | ..... | ..... | ..... |
| Seattle..... | 26.95 | ..... | ..... | ..... | ..... | ..... |
| Provo, Utah..... | 22.00 | 21.50 | ..... | ..... | ..... | ..... |
| Montreal..... | 27.50 | 27.50 | ..... | 28.00 | ..... | ..... |
| Toronto..... | 25.50 | 25.50 | ..... | 26.00 | ..... | ..... |

GRAY FORGE IRON: Valley or Pittsburgh furnace. \$23.50

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

Any Metal • Any Perforation

The uses of perforated metal are numerous and increasing. Industry requires it for a thousand purposes.

In the preparation of war materials, metals, food, rubber, chemicals, perforated metal is required to perform an important role.

The Harrington & King PERFORATING CO.

5657 FILLMORE STREET—CHICAGO 44, ILL.
Eastern Office, 114 Liberty Street, New York 6, N. Y.

178—THE IRON AGE, November 16, 1944

(1) Pittsburgh Coke & Iron Co (Sharpsville, Pa., furnace only) and the Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry basic, bessemer and malleable. Struthers Iron & Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorus iron; high phosphorus sells for \$28.50 at the furnace.

(3) E. & G. Brooke Co., Birdsboro, Pa.,
permitted to charge \$1.00 per ton extra

(4) Pittsburgh Ferromanganese Co (Chester furnace only) may charge \$2.10 a ton over maximum basing point price

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.1 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent) Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

| |
|--|
| Prices are based on current market prices of ingots plus a fixed figure. F.O.B shipping point, c. per lb., ton lots. |
| Copper, electrolytic, 150 and 200 mesh 21 $\frac{1}{4}$ to 23 $\frac{3}{4}$ |
| Copper, reduced, 150 and 200 mesh 20 $\frac{1}{4}$ to 25 $\frac{1}{4}$ |
| Iron, commercial, 100 and 200 mesh 96 + % Fe 13 $\frac{1}{2}$ to 15 |
| Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots 40 |
| Iron, hydrogen reduced, 300 mesh and finer, 98 $\frac{1}{4}$ + % Fe, drum lots 63 |
| Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe. 30 to 33 |
| Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe 41 |
| Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe 30 |
| Aluminum, 100 and 200 mesh 23 to 27 |
| Antimony, 100 mesh 20.50 |
| Cadmium, 100 mesh 31 |
| Chromium, 150 mesh \$1.00 |
| Lead, 100, 200 & 300 mesh, 11 $\frac{1}{4}$ to 12 $\frac{1}{4}$ |
| Manganese, 150 mesh 51 |
| Nickel, 150 mesh 51 $\frac{1}{4}$ |
| Solder powder, 100 mesh, 8 $\frac{1}{2}$ c. plus metal |
| Tin, 100 mesh 55 $\frac{1}{4}$ |
| Tungsten metal powder, 98%- 99%, any quantity, per lb. \$2.00 |
| Molybdenum powder, 99%, in 200- lb. kegs, f.o.b. York, Pa., per lb \$2.00 |
| Under 100 lb. \$3.00 |

*Freight allowed east of Mississippi.

COKE

| | | Net Tons |
|--------------------------------|--|----------|
| Furnace, beehive (f.o.b. oven) | | |
| Connelville, Pa. | | \$7.00 |
| Foundry, beehive (f.o.b. oven) | | |
| Fayette Co., W. Va. | | 8.10 |
| Connelville, Pa. | | 8.25 |
| Foundry, By-Product | | |
| Chicago, del'd | | 13.55 |
| Chicago, f.o.b. | | 12.60 |
| New England, del'd | | 14.25 |
| Kearny, N. J., f.o.b. | | 12.65 |
| Philadelphia, del'd | | 12.88 |
| Buffalo, del'd | | 13.00 |
| Portsmouth, Ohio, f.o.b. | | 11.10 |
| Painesville, Ohio, f.o.b. | | 11.75 |
| Erie, del'd | | 12.75 |
| Cleveland, del'd | | 12.80 |
| Cincinnati, del'd | | 13.55 |
| St. Louis, del'd | | 13.55 |
| Birmingham, del'd | | 10.60 |

*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges.

PRICES

REFRACTORIES (F.o.b. Works)

Fire Clay Brick

| | Per 1000 |
|---|----------|
| Super-duty brick, St. Louis | \$64.60 |
| First quality, Pa., Md., Ky., Mo., Ill. | 51.30 |
| First quality, New Jersey | 56.00 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 46.55 |
| Sec. quality, New Jersey | 51.00 |
| No. 1 Ohio | 43.00 |
| Ground fire clay, net ton | 7.60 |

Silica Brick

| | Per Net ton |
|--|-------------|
| Standard chemically bonded, Balt., Plymouth Meeting, Chester | \$54.00 |
| Chemically bonded, Baltimore | 65.00 |

Magnesite Brick

| | Per Net ton |
|-----------------------------|-------------|
| Standard, Balt. and Chester | \$76.00 |

| | Per Net ton |
|------------------------------|-------------|
| Chemically bonded, Baltimore | 65.00 |

| | Per Net ton |
|------------------------------------|-------------|
| Domestic, f.o.b. Balt. and Chester | \$43.48 |
| Domestic, f.o.b. Chewelah, Wash. | 22.00 |

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

| | Standard rails, heavier than 60 lb. |
|--|-------------------------------------|
| No. 1 O.H., gross ton | \$40.00 |
| Angle splice bars, 100 lb. | 2.70 |
| (F.o.b. Basing Points) Per Gross Ton | |
| Light rails (from billets) | \$40.00 |
| Light rails (from rail steel) | 39.00 |
| Base per Lb. | |
| Cut spikes | 3.00c. |
| Screw spikes | 5.15c. |
| Tie plate, steel | 2.15c. |
| Tie plates, Pacific Coast | 2.30c. |
| Track bolts | 4.75c. |
| Track bolts, heat treated, to rail-roads | 5.00c. |
| Track bolts, jobbers discount | 63.5 |

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Welton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

| | No. 304 | No. 302 |
|-------------------|---------|---------|
| Forging billets | 21.25c. | 20.40c. |
| Bars | 25.00c. | 24.00c. |
| Plates | 29.00c. | 27.00c. |
| Structural shapes | 25.00c. | 24.00c. |
| Sheets | 36.00c. | 34.00c. |
| Hot rolled strip | 23.50c. | 21.50c. |
| Cold rolled strip | 30.00c. | 28.00c. |
| Drawn wire | 25.00c. | 24.00c. |

Straight-Chromium Alloys

| | No. 410 | No. 430 | No. 442 | No. 446 |
|------------|----------|---------|----------|----------|
| F.Billets | 15.725c. | 16.15c. | 19.125c. | 23.375c. |
| Bars | 18.50c. | 19.00c. | 22.50c. | 27.50c. |
| Plates | 21.50c. | 22.00c. | 25.50c. | 30.50c. |
| Sheets | 26.50c. | 29.00c. | 32.50c. | 36.50c. |
| Hot strip | 17.00c. | 17.50c. | 24.00c. | 35.00c. |
| Cold strip | 22.00c. | 22.50c. | 32.00c. | 52.00c. |

Chromium-Nickel Clad Steel (20%)

| | No. 304 | No. 446 |
|--------|---------|---------|
| Plates | 18.00c. | |
| Sheets | 19.00c. | |

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

| | Per Lb. |
|---|---------|
| Field grade | 3.20c. |
| Armature | 3.55c. |
| Electrical | 4.05c. |
| Motor | 4.95c. |
| Dynamo | 5.65c. |
| Transformer 72 | 6.15c. |
| Transformer 65 | 7.15c. |
| Transformer 58 | 7.65c. |
| Transformer 52 | 8.45c. |
| F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades. | |



Did you Know?

Over 50% of furnace wall radiation losses alone can be stopped? Therm-O-Flake insulation is preferred for this work in most steel plants.

Here's why!

Highest insulating value — easy to apply — low maintenance — low cost — high reclamation — sticks tightly to silica or basic brick — permits closer control of fuel-air ratios — reduces cold air infiltration.



JOLIET, ILL.

Therm-O-Flake
HIGH TEMPERATURE INSULATION
BRICK - BLOCK - COATINGS - CONCRETE - GRANULES



Are your mechanical developments in the stage where you are searching for just the right kind of spring? Then call on B-G-R engineers for advice on choice of material, type of action, and correct design—for economy in manufacture and ease of operation. Be guided by B-G-R—it pays!



Fast **Tough**

Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively unbreakable under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

The same exclusive unbreakable feature of MARVEL Hack Saw Blades is also a feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from $\frac{1}{8}$ " to $4\frac{1}{2}$ " diameter in stock up to $1\frac{1}{2}$ " thick. Usable in portable drill, drill press, or lathe tail stock.

Heavy feed at high speed!

ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

A client of ours had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so they did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points more copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from $\frac{3}{8}$ " to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING,
SIZING OR REDUCING OF ROUND SOLIDS
OR TUBING...

Ask Etna
About Swaging.



ETNA
MACHINE COMPANY
TOLEDO

PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk) \$13.00
Carload lots (packed) 141.00
Less ton lots (packed) 148.50
\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk 36c.
L.c.l. lots 38c.
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk 34c.
L.c.l. lots 35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

16-19% Mn 19-21% Mn
3% max. Si 3% max. Si

Carloads \$35.00 \$36.00

Less ton 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed.

| | Eastern Zone | Central Zone | Western Zone |
|-----------|--------------|--------------|--------------|
| 50% Si | 6.65c. | 7.10c. | 7.25c. |
| 75% Si | 8.05c. | 8.20c. | 8.75c. |
| 80-90% Si | 8.90c. | 9.05c. | 9.55c. |
| 90-95% Si | 11.05c. | 11.20c. | 11.65c. |

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 \$t)
F.o.b. Jackson, Ohio \$29.50*

Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorous or over.

*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| 96% Si, 2% Fe | 13.10c. | 13.55c. | 16.50c. |
| 97% Si, 1% Fe | 13.45c. | 13.90c. | 16.80c. |

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|-------------------|--------------|--------------|--------------|
| Carload, bulk | 3.35c. | 3.50c. | 3.65c. |
| 2000 lb.-car-load | 3.8c. | 4.2c. | 4.25c. |

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

| | Eastern Zone | Central Zone | Western Zone |
|---------------------|--------------|--------------|--------------|
| Carload, bulk | 6.05c. | 6.70c. | 6.90c. |
| 2000 lb. to carload | 6.90c. | 7.00c. | 7.20c. |
| Under 2000 lb. | 5.80c. | 6.30c. | 6.50c. |

Briquets, contract, basis carlots, bulk freight allowed, per lb. 2000 lb. to carload 5.80c. Less ton lots 6.30c. 6.50c.

Ferrochrome

(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|-------------------|--------------|--------------|--------------|
| 0.06% Cr | 23.00c. | 23.40c. | 24.00c. |
| 0.10% Cr | 22.50c. | 22.90c. | 23.50c. |
| 0.15% Cr | 22.00c. | 22.40c. | 23.00c. |
| 0.20% Cr | 21.50c. | 21.90c. | 22.50c. |
| 0.50% Cr | 21.00c. | 21.40c. | 22.00c. |
| 1.00% Cr | 20.50c. | 20.90c. | 21.50c. |
| 2.00% Cr | 19.50c. | 19.90c. | 21.00c. |
| 4.10% Cr | 13.00c. | 13.40c. | 14.00c. |
| 62-66% Cr, 5-7% C | 13.50c. | 13.90c. | 14.50c. |

PRICES

High-Nitrogen Ferrochrome

Low-carbon type: 64-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 3c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

| Carloads, Ton | Less | Bulk | Lots | Ton |
|-------------------------------|---------|---------|---------|-----|
| 0.10% max. C, 1 or 2% max. Si | 23.00c. | 23.40c. | 23.65c. | |
| 0.15% max. C, 1 or 2% max. Si | 22.00c. | 22.40c. | 22.65c. | |
| 0.30% max. C, 1 or 2% max. Si | 21.00c. | 21.40c. | 21.65c. | |
| 0.50% max. C, 1 or 2% max. Si | 20.00c. | 20.40c. | 20.65c. | |
| 0.75% max. C, 1 or 2% max. Si | 16.00c. | 16.40c. | 16.65c. | |

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

| Eastern | Central | Western | |
|---------------|---------|---------|---------|
| Zone | Zone | Zone | |
| Carload, bulk | 8.25c. | 8.55c. | 8.95c. |
| Ton lots | 8.75c. | 9.25c. | 10.75c. |
| Less ton lots | 9.00c. | 9.50c. | 11.00c. |

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

| Eastern | Central | Western | |
|---------------|---------|---------|--------|
| Zone | Zone | Zone | |
| Carload, bulk | 6.05c. | 6.30c. | 6.60c. |
| Ton lots | 6.55c. | 7.55c. | 8.55c. |
| Less ton lots | 6.80c. | 7.80c. | 8.80c. |

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

| Eastern | Central | Western | |
|---------------|---------|---------|---------|
| Zone | Zone | Zone | |
| Carloads | 15.50c. | 16.00c. | 18.05c. |
| Ton lots | 16.50c. | 17.35c. | 19.10c. |
| Less ton lots | 17.00c. | 17.85c. | 19.60c. |

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

| Cast | Turnings | Distilled | |
|---------------|----------|-----------|--------|
| Ton lots | \$1.80 | \$2.30 | \$5.00 |
| Less ton lots | 2.30 | 2.80 | 5.75 |

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot 45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

| Eastern | Central | Western | |
|---------------|---------|----------|---------|
| Zone | Zone | Zone | |
| Ton lots | \$1.20 | \$1.2075 | \$1.229 |
| Less ton lots | 1.30 | 1.3075 | 1.329 |

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

| Eastern | Central | Western | |
|---------------|---------|---------|---------|
| Zone | Zone | Zone | |
| Ton lots | \$1.89 | \$1.903 | \$1.935 |
| Less ton lots | 2.01 | 2.023 | 2.055 |

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

| Eastern | Central | Western | |
|--------------------|---------|----------|----------|
| Zone | Zone | Zone | |
| 11,200 lb. or more | \$1.90 | \$1.9125 | \$1.9445 |
| Ton lots | 2.00 | 2.0125 | 2.0445 |
| Less ton lots | 2.10 | 2.1125 | 2.1445 |

Other Ferroalloys

Ferrotungsten, Standard grade, lump or $\frac{1}{4}$ X down, packed, f.o.b. plant at Niagara Falls, New York. Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more. \$1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth \$2.70

Crucible \$2.80

Primos \$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal. \$1.50

Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5 . Spot sales add 5c. per lb. contained V_2O_5 .

Ferroboron, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.

2000 lb. to carload \$1.20

Under 2000 lb. 1.30

Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots 25c.

2000 lb. to carload 26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots 58c.

2000 lb. to carload 59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1 87.5c.

No. 6 60c.

No. 79 45c.

Bortram, f.o.b. Niagara Falls

Ton lots, per lb. 45c.

Less ton lots, per lb. 50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Ch.

2000 lb. lots \$2.25

Under 2000 lb. lots \$2.30

Ferrotitanium, 40%-45%, 0.10% C, max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti. \$1.23

Less ton lots \$1.25

Ferrotitanium, 20%-25%, 0.10% C, max., ton lots, per lb. contained titanium

Less ton lots \$1.35

High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload. \$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton. \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Silio), Tenn., \$3 unitage freight equalized with Nashville, per gross ton. \$75.00

Ferromolybdenum, 55-75%, f.o.b. Langloch, Washington, Pa., any quantity, per lb. contained Mo.

Calcium molybdate, 40%-45%, f.o.b. Langloch and Washington, Pa., any quantity, per lb. contained Mo.

Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langloch, Pa., per lb. contained Mo.

Molybdenum oxide, in cans, f.o.b. Langloch and Washington, Pa., per lb. contained Mo.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales

Carload lots 80c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy

Carload, bulk 80c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk

Ton lots 5.75c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots 7.25c.

Ton lots 8.75c.

Car lots 9.25c.

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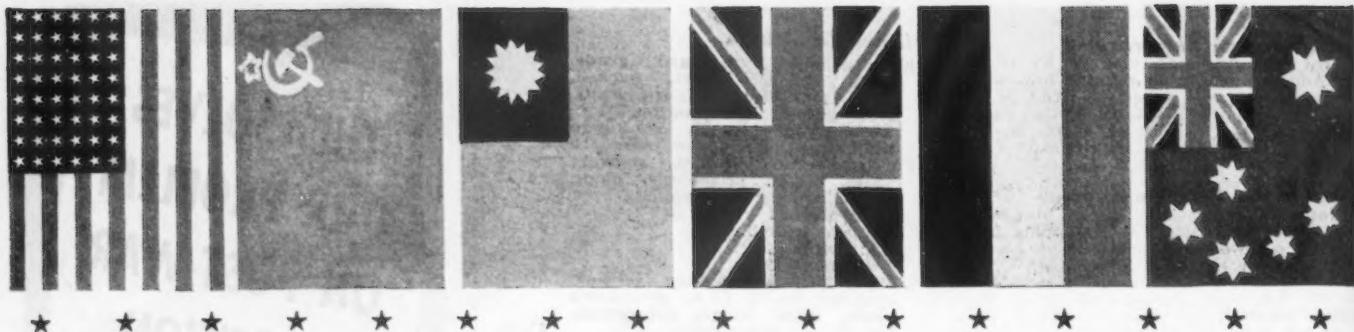


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